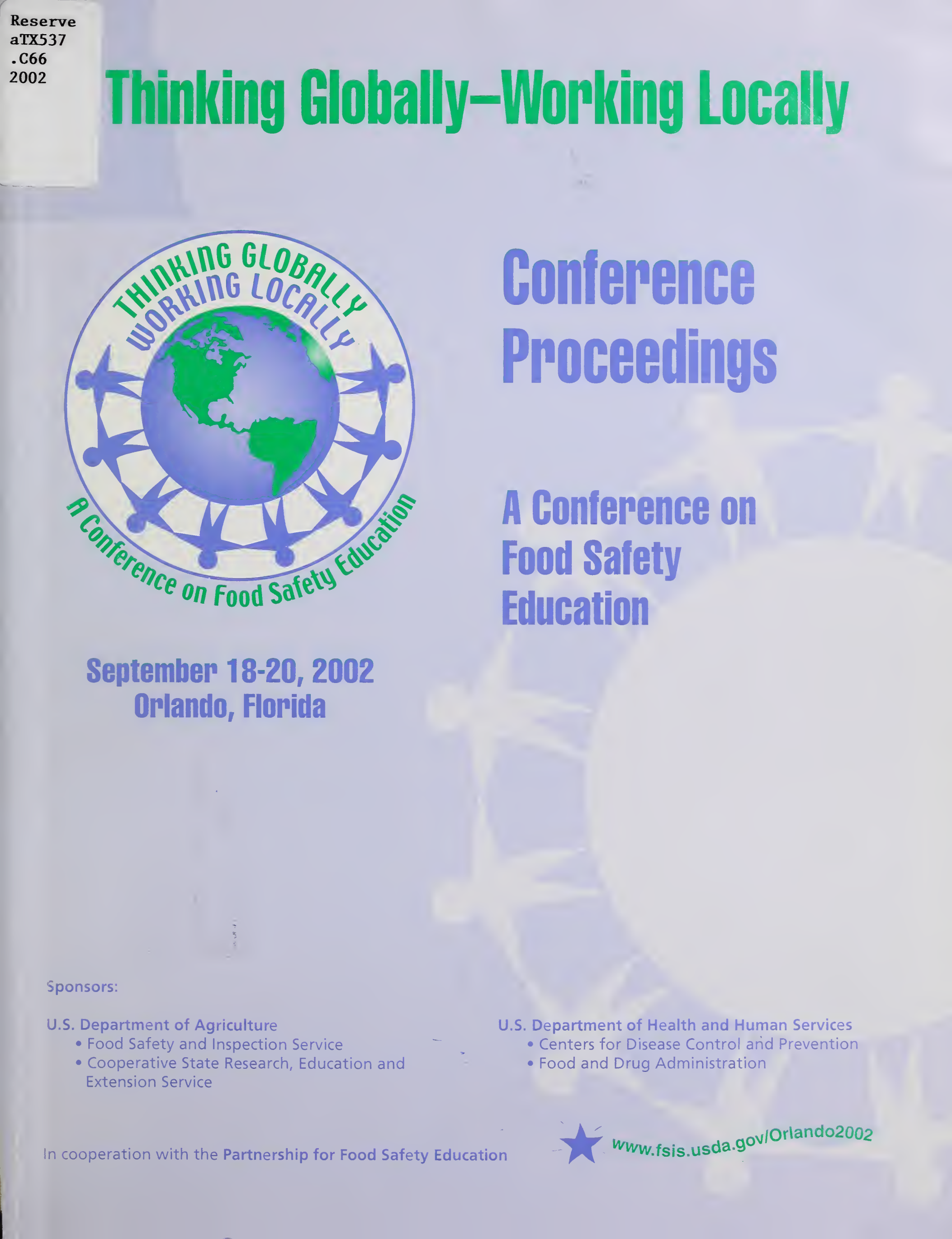


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# Thinking Globally—Working Locally



## Conference Proceedings

### A Conference on Food Safety Education

**September 18-20, 2002**  
**Orlando, Florida**

#### Sponsors:

##### U.S. Department of Agriculture

- Food Safety and Inspection Service
- Cooperative State Research, Education and Extension Service

##### U.S. Department of Health and Human Services

- Centers for Disease Control and Prevention
- Food and Drug Administration

In cooperation with the Partnership for Food Safety Education



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United States  
Department of  
Agriculture



**National Agricultural Library**

**Tommy Thompson, Secretary,  
U.S. Department of Health and Human  
Services**

*"As risk communicators, educators, public health officials, and industry leaders, you are the men and women to whom we turn to make sure what we eat is not contaminated and what we drink is pure..."*

*"You share the best ways to keep our food supplies safe... millions of men, women, and children depend on what you do. I use the word 'depend.' I use it deliberately... You are on the front lines in the defense against illnesses transmitted by food."*

**Ann Veneman, Secretary, U.S. Department  
of Agriculture**

*"We can never do too much when educating people about the importance of food safety. That's why we must continually improve the information we share with consumers, food handlers, and the food sector, so that they understand basic food safety practices. They also must be kept apprised of the many changes and advances being made with technology and in other areas that are strengthening the food supply."*

*"All of us understand the immense challenges we face. We share the ultimate goal of protecting the food supply. Together we have made great strides, but much work remains to be accomplished. We need to continuously review our programs, examine closely the best science, and work with all interested parties... to move forward and make progress in a responsible and aggressive manner."*

## Conference Proceedings

### Thinking Globally—Working Locally: A Conference on Food Safety Education

From September 18 through September 20, 2002, more than 600 food safety educators from around the United States and the world gathered in Orlando, Florida, to attend *Thinking Globally—Working Locally: A Conference on Food Safety Education*.

It was sponsored by:

#### U.S. Department of Agriculture

- Food Safety and Inspection Service
- Cooperative State Research, Education and Extension Service

#### U.S. Department of Health and Human Services

- Centers for Disease Control and Prevention
- Food and Drug Administration

In cooperation with the Partnership for Food Safety Education

Conference speakers covered the gamut of topics, addressing global issues, updating attendees on the status of food safety in the U.S., discussing food safety communications in a world confronting bioterrorism, summarizing the latest findings in consumer research, and highlighting educational initiatives from around the country and the world.



### **September 18:**

- Keynote speaker Sir John Krebs, Chairman, Food Standards Agency, the United Kingdom, explored the dilemma of building public trust when that trust has been shaken following that nation's crisis with bovine spongiform encephalopathy (BSE) contamination in cattle.
- Leaders of U.S. Federal agencies responsible for food safety reported on progress and the challenges ahead. A number of experts noted new concerns from evolving microbiological threats. But while the war on microbes may never be won, as one expert said, it's also not lost because "we can learn and transfer knowledge. Food safety education folks will always have a job to do."
- Consumer researchers from national and local levels pointed to thought-provoking trends: they noted that knowledge of safe food handling does not necessarily translate to behavior. Consumers, they said, tend to be overconfident and unaware of the mistakes they make.
- The last session of the first day provided a glimpse of the many food safety education programs at work throughout the country and the world, showcasing five innovative programs.

### **September 19:**

The morning general session focused on crisis communication and biosecurity. Communicators and public health officials drew from their experiences dealing with anthrax. Their stories illustrated why, as one said, "preparation is a journey, not a destination."

After the general session, concurrent sessions offered participants information on writing grants; establishing research programs; local, regional, and national partnerships; and food safety education projects.

On both the first and second days of the conference, more than 80 poster presentations were showcased, addressing topics as diverse as training programs for Arab homemakers to Internet-based training for food service workers.

### **September 20:**

The final morning of the conference evidenced the energy and enthusiasm of food safety educators as they participated in an Interactive Collaborative Planning Process—a session specifically designed to assess educators' goals and target future directions.

The Planning Process utilized information collected from educators during the previous 2 days of the conference. Attendees had logged on to a special Web site at computer kiosks to voice their thoughts regarding their goals and food safety education needs and provide information on their budgets and organizations. Eighty-two percent of the conference attendees provided input.

On the last day of the conference, this data—along with the knowledge and experiences gleaned from the conference itself—were used to create an Interactive Collaborative Planning Process. Everyone's knowledge, experience, and best ideas were brought to the fore as regional teams gathered to put theory into action—to think globally and act locally.

It was high energy, said one participant. "I'm ready to go home and get going!"

#### **The following conference proceedings present:**

- benchmark information presented at the conference's general sessions,
- results of the Interactive Collaborative Planning Process, and
- summaries of a selection of the poster presentations.

**U.S.D.A., NAL**

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**CATALOGING PREP**

**Wednesday, September 18, 2002**

## **Welcome and Opening Remarks**

***Dr. Elsa A. Murano, Under Secretary for Food Safety,  
U.S. Department of Agriculture***

Dr. Elsa A. Murano was sworn in as Under Secretary for Food Safety for the U.S. Department of Agriculture (USDA) on October 2, 2001. In this position, she oversees the policies and programs of the Food Safety and Inspection Service.

Dr. Murano has extensive public and private experience in the field of food safety as both a manager and educator. From 1995 until 2001, she held several positions with Texas A&M University at College Station, TX. Since 1997, she served as director of the University's Center for Food Safety. During this time, she also served on the University's Department of Animal Science Research Advisory Committee and the Food Safety Response Team of the Texas Agriculture Extension Service, and served from 1999 to 2001 as the Chair of the Food Safety State Initiative Committee of the Texas Agriculture Experiment Station.

A native of Havana, Cuba, Dr. Murano holds a B.S. degree in biological sciences from Florida State University in Miami. She also holds an M.S. degree in anaerobic microbiology and a Ph.D. in food science and technology, both from Virginia Polytechnic Institute and State University in Blacksburg, VA.

USDA Under Secretary for Food Safety Dr. Elsa A. Murano welcomed conference attendees and noted that she's been on the road herself with the educational messengers BAC! and Thermy™, visiting senior centers and schools.

And while she's been teaching food safety, she said, she's also been learning. "I've learned there are many eager students out there—of all ages and from all backgrounds. At the senior center I visited in San Antonio, I was surprised at how many basic questions people had about handling and storing food safely. At a grilling event, people were surprised to learn that they could use a food thermometer to check the doneness of burgers, and that cooking them to 160 °F is a much better way than by checking color to ensure that harmful *E. coli* organisms have been destroyed.

"So there are lots of opportunities out there for us, as educators, to make a difference. And I have seen first hand your commitment to spreading food safety messages. While I enjoy getting out of Washington to educate folks on food safety, I certainly can't do that every day. You truly deserve our thanks for being there on the front lines day in and day out."

As the top public health official at USDA, Murano's primary role is to oversee the safety of meat, poultry, and egg products. "The majority of USDA's regulatory authority is focused on slaughter and processing

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*Dr. Elsa A. Murano*



plants, and my job is to ensure that policies are in place to reduce, to the greatest extent, pathogens that can cause foodborne illness.

"We have seen many successes," Murano said. "Testing in plants reveals that *Salmonella* levels in a variety of products are down, for instance, and that corresponds to a reduction in illnesses reported by the Centers for Disease Control and Prevention.

"But, as Secretary Veneman said, ensuring food safety is a farm-to-table job. Food safety education is certainly not a substitute for, but a complement to, science-based food safety policies. I would like nothing better than to tell people that they don't need to worry about how they handle and prepare their food because the government has taken care of the problem. I wish I could say that, but I can't. We will continue to strive for greater reductions in harmful pathogens within plants. But regardless of what we can accomplish, consumers always will have an important role in keeping food safe."

"Many of us in the food safety business like to talk in terms of a risk analysis framework—that is, risk assessment, risk management, and risk communication. Education is a critical element of this framework...because educating consumers is an important way to reduce the risk of foodborne illness. This is very clear, for example, in the work we have all done in educating high-risk population groups about *Listeria monocytogenes*. Education is also a risk communication function, because it serves to alert the public about a hazard that exists and can be addressed by safe food handling and food choices.

"As we continue to examine emerging and existing food safety problems, it is important that we remember that reducing foodborne illness requires numerous interventions all along the farm-to-table chain. We must consider all the strategies available to us—including education—to make the food supply safer," she added.

Today's educators, Murano noted, face many challenges. The data presented at the conference will reveal, for instance, that what consumers say they do and what they really do when handling food "may be miles apart." The data will also report on the current state of foodborne illness in the U.S., "and there is room for improvement in the prevention of illness," she pointed out.

And education today, Murano said, "is not just about the basics of safe food handling, although this certainly remains our greatest need. There are many new products in the marketplace and technologies being used that people need to know about, such as biotechnology, organic foods, and irradiation. The job will fall on you, as leaders in education, to help us give the public the most accurate and up-to-date information on these new and evolving products and technologies.

"And of course, the increasing diversity of the population is another hurdle we face. Our strategies must reach the many diverse cultures and languages."

"As we continue to examine emerging and existing food safety problems, it is important that we remember that reducing foodborne illness requires numerous interventions all along the farm-to-table chain. We must consider all the strategies available to us—including education—to make the food supply safer."



Murano recognized the difficulties inherent in changing behaviors as well as dealing with diverse populations. "Despite these challenges," she said, "I am an optimist at heart. I believe we can truly make a difference in changing behavior.

"I think it is very exciting to see how the science of food safety education is evolving in terms of developing messages and targeting audiences. Just as we are learning in medicine that not all medications work the same for all people...we know that one size does not fit all in education. We cannot reach all people with the same messages and the same methods of delivery.

"I want to assure you," she continued, "that we are committed to helping you meet these food safety education challenges, because we are all in this together....We are your partners, and we will continue to be your partners.

"We have provided you with educational materials, and we will continue to do so. And we will continue to facilitate discussions, just as we are doing here today, to keep everyone up to date on the latest in food safety education."

***Dr. Rodney J. Brown, Deputy Under Secretary for Research, Education, and Economics, U.S. Department of Agriculture***

Dr. Rodney J. Brown was appointed Deputy Under Secretary for Research, Education, and Economics for the U.S. Department of Agriculture (USDA) on February 8, 2002. His responsibilities include working with the four agencies of USDA's research mission area that include the Agricultural Research Service; the Cooperative State Research, Education, and Extension Service; the Economic Research Service; and the National Agricultural Statistics Service.

Dr. Brown served as professor and dean of agriculture at Utah State University for 8 years before accepting this appointment. He recently chaired the Board on Agriculture of the National Association of State Universities and Land Grant Colleges.

Dr. Brown received his Ph.D. in food science in 1977 from North Carolina State University in Raleigh. He was awarded his M.A. in nutrition and food sciences in 1973 from Utah State University in Logan. In 1972, he earned his B.S. at Brigham Young University in Provo, UT.

Dr. Rodney J. Brown, Deputy Under Secretary for Research, Education, and Economics, USDA, told conference attendees, "I commend you. You are in a field that saves people's lives by teaching food safety." Observing how the world has changed in the past 100 years, Brown called for extending the farm-to-table food safety concept to the whole world.

"It's a tremendous challenge and we are determined to accomplish it," he said. "The extension service is one of the strongest and most capable outreach organizations in the world....



"Eating should not be a hazardous activity, and, on a numerical risk basis, it isn't," he said. "Many things we do every day have much higher risks. But it is not acceptable to have risks from eating. The public isn't as convinced of the safety of our food supply today as they have been in years past. This uncertainty stems from several sources, including concerns about the global food supply and the uneasiness caused by the September 11 terrorist attacks," according to Brown.

"Our citizens increasingly worry about things such as food safety and the nutritional content of their food," he said. Brown noted that food imports have increased steadily in the last 25 years, and that most imports are fresh or minimally processed fruits and vegetables.

"Indeed, technological revolutions in transportation, communication, and information have created a global food network in which our food is produced, preserved, processed, prepared, transported, and handled by a series of people, potentially from around the world, before it reaches our tables. From this modern food system," Brown noted, "we derive many benefits, not the least of which is the variety and the high nutritional content of our food supply. The tradeoff, however, is our dependence on markets in other countries, and the competition from around the world facing local businesses engaged in growing, producing, and distributing food in the United States," Brown asserted.

"U.S. government agencies, professional groups, academia, and industry have adopted a farm-to-table approach to food safety," he said, "addressing food quality problems with science-based solutions. Our efforts to extend this system, in cooperation with other countries, is a tremendous challenge," according to Brown, "but one the United States is determined to meet."

"The September 11 terrorist attacks were an additional assault on our food system," he said, noting that, "immediately after the attacks the focus was on air traffic control systems, military preparedness, and other activities designed to protect the country. Now," Brown said, "concerns have shifted to food."

"The largest shift in my mind," he said, "has been in the direction of food—food security, food safety, and food availability for the American people—and the things that need to be done to protect our food. Now we must be concerned with intentional as well as unintentional threats," he said. "Only a few years ago, when we said 'food security' we meant 'enough food available for everyone.' Now when we say 'food security,' it has an entirely different meaning."

"To deliver our food safety messages, government agencies are working to educate food processors, food producers, news media, and a multitude of other groups, while risk communicators and food safety educators reach out to the public," Brown added. "Food safety education efforts must help people understand that they need to feel and be responsible for themselves in the area of food safety. We even have to find ways to reach outside of our own food

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*Dr. Rodney J. Brown*



"Food safety is a compelling public health issue. What we do in food safety affects every single person, every single day. I don't know what could be more important than that. The singular goal we want to accomplish is to keep getting the word out about food safety. This is the kind of work that has just begun."

*Joseph A. Levitt*

system to ensure food safety within our system," he said, noting that, "risks for foodborne illnesses occur everywhere that food is handled and eaten."

Citing USDA's 140-year history of food safety research, Brown called for the addition of behavioral research. "One of the biggest problems is learning how to encourage people to change their behavior. Many times people know what to do, they know the hazards, but their behavior doesn't change."

"Food safety educators have done a lot to educate the public," he said, thanking conference participants. "I encourage you, however, as much as possible, to broaden and deepen the things you are doing, to concentrate harder on the hardest parts of your work—and to keep on keeping at it."

***Joseph A. Levitt, Director, Center for Food Safety and Applied Nutrition U.S. Food and Drug Administration***

On February 1, 1998, Joseph A. Levitt was appointed Director of the Center for Food Safety and Applied Nutrition (CFSAN) at the U.S. Food and Drug Administration (FDA). In this capacity, Mr. Levitt provides executive leadership to the Center's development and implementation of programs and policies regarding the composition, quality, safety, and labeling of foods, food and color additives, dietary supplements, and cosmetics. These products account for nearly 80 percent of the nation's food supply.

Mr. Levitt began his FDA career in 1978 in the Office of the General Counsel. He later joined the FDA Commissioner's Office and held various positions. His FDA position prior to becoming CFSAN Director was Deputy Director for Regulations and Policy at FDA's Center for Devices and Radiological Health.

Mr. Levitt has received numerous awards for his contributions and achievements, including three Presidential Executive Rank Awards.

Mr. Levitt's B.A. degree is from Cornell University in 1975 where he graduated magna cum laude. He graduated cum laude from Boston University in 1979, where he was a member of the law review. Mr. Levitt is a member of the Massachusetts Bar Association and the Phi Beta Kappa Society.

"Food safety is a compelling public health issue. What we do in food safety affects every single person, every single day. I don't know what could be more important than that. The singular goal we want to accomplish is to keep getting the word out about food safety. This is the kind of work that has just begun," said Joseph A. Levitt in his opening remarks. The numbers the Centers for Disease Control and Prevention (CDC) has issued—76 million foodborne illnesses; 325,000 hospitalizations, and 5,000 deaths annually—are compelling figures, he said, and it is what draws us to note that we need to "press on and do more."



Levitt identified several of the reasons why foodborne illness is occurring:

- Diets that include more fresh, often imported produce;
- Fewer meals prepared at home; and
- Vulnerable populations that comprise 25 percent of the U.S. population—the very young, the elderly, pregnant women, and people with weakened immune systems.

The FDA, the U.S. Department of Agriculture (USDA), and their sister agencies are actively addressing the challenge of reducing foodborne illness, he said. “Together,” Levitt added, “we have created newer surveillance systems, stronger prevention programs, and faster outbreak response. We need to continue and strengthen these programs still further.”

Levitt cited a number of Federal surveillance systems now in place. FoodNet, established at sentinel sites across the country, monitors and tracks the progress of foodborne illness. PulseNet uses a DNA fingerprinting system to pinpoint the causes of foodborne illnesses, resulting in rapid outbreak response. Another surveillance system is used for identifying antimicrobial resistance and a collaborative laboratory network, called E-LexNet, now under development.

We have, across the board, strong prevention programs, he said. A food safety system called Hazard Analysis and Critical Control Point (HACCP) has been expanded to include fruit and vegetable juices, as well as seafood, meat, and poultry. Good agricultural practices are in place for produce, the *Food Code* is being adopted at the State level for the retail sector, and the import inspection program is growing.

Finally, he said, “We have faster outbreak response—the surveillance system was designed to be an early warning network. The warning is good only if you do something about it. Just as they say, all politics is local, a lot of food safety is local. The outbreaks start at the local level. Local, State, and Federal governments are all in this together.”

“Where does the role of food safety education fit in?” Levitt asked. “It is central and it is critical.” Levitt went on to say that education programs need to be “ongoing and enduring.” He identified some examples of recent food safety education initiatives:

- Fight BAC!® for the general consumer;
- FDA’s *Science and Our Food Supply* for teens;
- Programs targeted to vulnerable populations—seniors and pregnant women, for example;
- Materials in various languages;
- Product specific campaigns on juice and egg safety;
- *Vibrio vulnificus* education for Hispanic men in California;
- Physician education including identification of systems, treatment, and reporting of foodborne illness; and
- Food handler education for food service and retail employees.

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Levitt explained that FDA has also taken its food safety message on the road. Known as the "International Road Show," teams from FDA, CDC, and USDA have traveled to Central and South America, Africa, Asia, the South Pacific, the European Union, and Eastern Europe. They presented training sessions designed to educate foreign producers about U.S. food safety requirements, foodborne illness surveillance programs, and U.S. education programs for both producers and consumers.

Regarding food bioterrorism, Levitt said that food safety education is central and critical to a safe food supply. "We have made changes after the September 11 attacks," he said. "We are trying to apply the same type of analytical thinking and science-based approach to this problem that we do to food safety in general, while looking through the lens of homeland security. We are looking at how to identify the risks, how to prevent them when we can, and how to respond quickly when we must.

"We have to be thinking about new educational messages that address this issue. We need to encourage greater vigilance by consumers in looking at the foods they eat," he said. "We also have to look more carefully at risk communication in a time of uncertainty. The September 11 attacks demonstrated that 'public credibility' in times of crisis is critical," he said, "and more important than providing specific information about 'what to do.'"

Everyone's help is needed to do this, he said, thanking participants for their work. "I hope that this week provides a little bit of a booster shot so we can all go back to our communities and stand up and make our food safer," he encouraged.

### **General Sessions:**

#### **Keynote Address:**

#### **Educate Locally, Improve Food Safety Globally: The Global Nature of Our Food Supply**

*Professor Sir John Krebs, Chairman, Food Standards Agency,  
United Kingdom*

*Sir John Krebs has held a Royal Society Research Professorship in the Department of Zoology, Oxford University, where he also has been a Fellow of Pembroke College since 1988. He has held posts at the University of British Columbia and the University of Wales, Bangor. Sir John is an internationally renowned scientist for his research on the behavior and ecology of animals. Between 1994 and 1999, Sir John was Chief Executive of the Natural Environment Research Council. Sir John is a Fellow of the Royal Society, a member of Academia Europaea and of the Max Planck Society, an Honorary Foreign Member of the American Academy of Arts and Sciences, and a Foreign Member of the American Philosophical Society. He has received numerous awards and honorary degrees for this scientific work.*



"I do not answer questions of the kind – 'Is food "x" safe?' – in absolute terms because there is no such thing as absolutely safe food," said Sir John Krebs. Questions such as this can't be answered in absolute terms, he said, because the science of food safety very often is incomplete and uncertain. "Science is a way of knowing and the facts evolve as knowledge evolves," he said, adding that government must tell the people what it knows and be willing to change its policies as the evidence changes.

Sir John is the Chairman of the Board of the Food Standards Agency (FSA), a non-ministerial government department established in 2000, partly in response to the bovine spongiform encephalopathy (BSE) crisis of the 1990's.

When the FSA was announced, public confidence in the government's handling of food safety issues was low, according to Sir John. The new Agency's goal was to "do away with the old climate of secrecy and suspicion surrounding the way in which food standards were handled in the United Kingdom and replace it with modern, open arrangements that will deliver real improvements in standards," Sir John said.

To change the public's perception, Sir John said that considerable time was spent defining a system that would engage the interested parties and the general public early in the decision-making process—and build trust.

"When we set out to try to move along this road of earning public trust and confidence, we realized that we had to be very different from the past," he said. "We recognized that we needed to be different both in *what* we were going to do and *how* we were going to do it," he added. "We are there solely to protect the consumer's interest. We are not there for industry or to make politically expedient decisions. We are about openness and honesty and involving the public," he explained.

As a result, Sir John said, the FSA is independent of influence from industry, government, and pressure groups. The Agency is led by a Board that is detached from the political process. The Board meets every 6 weeks and makes policy decisions in public. "We base our decisions on objective and impartial analysis of the evidence. It may be scientific evidence, it may be economic evidence, or it may be other kinds of evidence, but we are evidence-based."

"As educators, we realize that education isn't a one-way process. It's a two-way process," he said. "It involves people telling you, as well as you telling them. So as part of our program of openness, engagement, and involvement, we have developed a clearly defined system of bringing stakeholders from industry, consumer groups, health professionals, and the general public into the early development phase of our policies on food safety issues.

"We have a series of debates or discussions that may take place completely in public or may be a mixture of public and closed-session debates with stakeholders. It helps make the decisions more robust

"When we set out to try to move along this road of earning public trust and confidence, we realized that we had to be very different from the past," he said. "We recognized that we needed to be different both in *what* we were going to do and *how* we were going to do it," he added.

*Sir John Krebs*



"We don't naturally expect, through these debates, to reach an absolute consensus. Not everyone is going to be able to agree. But what we do expect is for people to have confidence in the process by which we reach a decision...."

than if they had been made just by us and then announced. It also gives us a way of challenging ourselves and allowing stakeholders to challenge each other," he explained.

"We don't naturally expect, through these debates, to reach an absolute consensus. Not everyone is going to be able to agree. But what we do expect is for people to have confidence in the process by which we reach a decision. We also don't expect to reach a decision after just one meeting, so we put a lot of effort into having a series of meetings on a particular issue and build a dialogue of trust and debate amongst the different points of view."

Public trust and confidence in the FSA is growing. In 2000, only 25 percent of the public felt they could trust the FSA. In 2001, that figure rose to 44 percent.

More people also believe the FSA's information is reliable. In 2000, 75 percent felt their information was reliable. By 2001, that figure had risen to 93 percent.

Sir John said that another component of building trust rests on the FSA's approach to education. "For me, an important part of improving people's appreciation of food safety policies is understanding risk and uncertainty," he explained.

In the old days, he said, the government's automatic response to food safety issues was to proclaim the food absolutely safe. It was a claim they could not always support. Following the BSE crisis, the government commissioned an inquiry into what went wrong with the handling of the crisis. The report emphasized the importance of honesty and not overstating reassurances.

Sir John summarized three additional lessons from the BSE crisis:

- When scientists offer advice, the government should challenge that advice.
- Science is an evolving body of knowledge and, therefore, as the facts change and as evidence changes, the government should be willing to change its policies.
- When government does develop a policy, it must make sure that it is effectively enforced.

"In reality, food, like everything else in life, is not risk free," Sir John said. Assessing risks—and remedies—is complex, he said. Policy makers frequently start off with incomplete science. They also need to consider the cost and feasibility of implementing particular regulations. And, he said, "we need to consider public opinion. The public is much less likely to accept risks in relation to food. All of these elements inform our judgment and policy making," he explained. In the end, he said, "we might decide to do nothing, we might inform people, or we might introduce new restrictions."

What is very important, he said, is that throughout the process decisions are discussed in a very public way. "Our approach is to acknowledge that we don't necessarily know all the facts, and to



bring people in—the public and interested parties—to develop our thinking as it goes along,” he said.

This process illustrates a new relationship between scientific knowledge and public policy, he explained. In the past, “we felt that if we educate people about the science behind our policies, their resistance would fade. We now realize that we need to learn what people think and respond to their concerns. We need to think of science within society,” he said. “It’s a different model than the linear relationship between assessment, management decision, and then communication that was followed 10 years ago. It is a more sophisticated message and one that the public is more comfortable living with,” he added.

Sir John pointed out that people’s attitudes towards risk and scientific evidence don’t always match up. Science will say one thing and people will persist in believing another. “For example,” he said, “the experts that assess pesticide residues in food would say that the presence of pesticide residues at very low levels poses no significant threat to human health. But there are many members of the public in Britain who don’t like the idea of eating vegetables with minuscule levels of pesticides on them and are very anxious about it. When you say the scientific experts report that it is all fine, they say, ‘Well, we don’t trust those guys and, in any case, we don’t like it.’”

Genetically manufactured (GM) food is another example of the discrepancy between what the scientists say and what the public believes. The scientists who assess GM food safety in the U.K. say the foods are as safe as their conventional counterparts. The public says, “we don’t like it,” Sir John reported.

“So although consumer rejection of GM can be portrayed as a triumph of fear and ignorance over rationality and enlightenment,” he said, “it can also be seen as a perfectly rational response to risk.” From the consumers’ point of view, Sir John explained, “Science cannot be 100 percent confident that there is no risk to human health. The foods are not cheaper and don’t taste better. The public asks, ‘Why should I take the risk?’”

A voluntary moratorium on growing GM food crops in the U.K. is due to expire. The FSA is beginning the process of engaging consumers and interested parties in a debate to raise public awareness about the science, the economic implications, and the choice aspects of GM foods. “This is really a debate that is not about simply educating the public,” he said, “but about engaging the public in a dialogue and reaching beyond the well-known views of pressure groups to the views of the ordinary consumer.”

Another public policy area that stirs debate concerns globalization. Activists within the U.K. are calling for food to be produced and prepared within the U.K, although the country now imports 50 percent of the food supply. In addition, Sir John said, surveillance data doesn’t show imported food poses greater safety risks than domestically produced food. “The answer is not to prevent global

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“Our approach is to acknowledge that we don’t necessarily know all the facts, and to bring people in—the public and interested parties—to develop our thinking as it goes along,” he said.



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"We are not losing the war. But, unfortunately, it's probably a war we can't win. We need to think of the battle against foodborne illnesses not in terms of winning or losing, but as something that we have to do day in and day out, and do well—because if we don't, we can lose the battle."

*Dr. Arthur Liang*

trade, but to develop the correct systems to control problems when they arise," he said.

In addition to working to build public trust, the FSA has committed significant resources to educating food service employees, as well as consumers at home. The Agency has introduced a food hygiene campaign which mirrors the four Fight BAC!® messages—clean, don't cross-contaminate, cook, and chill. Using television ads and educational materials distributed through schools and local environmental health offices, the campaign focused initially on the food service trade and the public. Six months into the campaign, Sir John reported that 37 percent of respondents spontaneously recalled the campaign. But the impact is uncertain: 40 percent of food service staff still admitted to not washing their hands.

Regardless of the topic being debated—GM, globalization, safe food handling instruction—Sir John pointed out that "I think one of the challenges for all of us as educators is to find a way to allow a wider, genuine participation in the debates that lie behind policy making in the food area so that we can include and reach beyond the knowledge of the small expert elite."

### **Setting the Stage for Food Safety Educators: The Current State of Foodborne Illness in the United States**

*Arthur Liang, M.D., M.P.H., Centers for Disease Control and Prevention*

Currently Director of the Centers for Disease Control and Prevention's (CDC) Food Safety Office, Dr. Liang previously served as Associate Director for Public Health Practice, Division of Applied Public Health Training, Epidemiology Program Office, where he directed CDC's Preventive Medicine Residence. He is the Southeast Regent of the American College of Preventive Medicine, Accreditation Council for Graduate Medical Education, and a member of the Preventive Medicine Residency Advisory Committee for the Walter Reed Army Institute of Research. From 1987-1993, he was the Assistant Director for Science in the Division of Public Health Systems, Public Health Practice Program Office, CDC. He is a former State Epidemiologist, Chief, Communicable Disease Division, Hawaii Department of Health, and a member EIS of Class of 1980. He is board certified in General Preventive Medicine and Public Health. He has an M.P.H. from the University of Hawaii (1980), an M.D. from the University of Maryland (1974), and a B.A. from Oberlin College (1970).

In his "state of the union" report on foodborne illness, Dr. Art Liang said, "We are not losing the war. But, unfortunately, it's probably a war we can't win. We need to think of the battle against foodborne illnesses not in terms of winning or losing, but as something that we have to do day in and day out, and do well—because if we don't, we can lose the battle."

At the same time, he said, we have made progress, noting that infectious diseases were major causes of mortality and morbidity in the U.S. in the early 1900's. At that time, the leading cause of death



was tuberculosis, primarily from unpasteurized milk. The third leading cause of death was diarrhea. Today, neither of those illnesses appear in the top 10 in this country.

While many of the infectious diseases of concern in the 1900's are now controlled, he cautioned that others have made their presence known, most notably HIV. The same dynamic also has happened with foodborne illnesses and the pathogens that cause them, according to Dr. Liang. "By the 1970's," he said "we were adding a lot of different names to the list of known pathogens."

So why has the list of pathogens increased? Dr. Liang pointed out that we are more aware of pathogens today because of better surveillance systems and detection methods. Most significantly, he said, "a lot of the simple problems have been solved when it comes to foodborne pathogens. The complex issues are ahead of us."

In the past, Dr. Liang pointed out, we had limited perceptions about the various causes of foodborne illness. Today, "we recognize that foodborne illness turns out to be a complex interaction between host and environment," he said. This recognition has allowed us to identify additional factors in the foodborne illness equation: the evolving nature of microbes, the increasing number of susceptible populations, and changes in the food production environment.

As an example, Dr. Liang said, when people think of foodborne illness, they normally think of bacteria. But, he pointed out, the Norwalk virus is the single most common cause of identified foodborne illnesses, actually causing more illnesses than all the major bacteria combined. The Norwalk virus is very hardy and very low doses can produce illness, and it can be transmitted from person to person, as well as through food.

As another example of new challenges, he said, "We also used to think that acid foods were not high-risk foods, that the acidity inhibited bacterial growth or was anti-microbial. But it turns out that *E. coli* O157:H7 actually does well in some acid foods, like apple cider, salami, and mayonnaise."

We now realize that refrigeration, which inhibits the growth of most bacteria, may not be as effective an intervention against certain pathogens, Dr. Liang pointed out, noting that *Listeria* doesn't stop growing until the temperature gets close to 0 degrees Centigrade.

We are increasingly aware of problems posed by pathogens that are resistant to antibiotic treatments, he said. And we are more aware that some people face special risks from foodborne disease: the very young, the elderly, pregnant women, and people with weakened immune systems.

People are also changing their eating habits and risks of illness can rise with increased reliance on foods prepared by others, including convenience foods, salad bars, and fast foods. "Basically," he said, "we are eating more and more foods that have been prepared or processed at some level before they get to us. We are also eating out

Most significantly, he said, "a lot of the simple problems have been solved when it comes to foodborne pathogens. The complex issues are ahead of us."



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"The world is counting on you," he added. "and once you start, you can't stop. Because the 'bugs' will catch up with you. Are you up to the challenge?"

more and bringing food into the home that has already been prepared."

Environmental factors affecting the risk of contracting foodborne illness in the U.S. include centralized food production and changes in food production methods. Because of mass production and distribution, increasing numbers of large multi-State outbreaks of foodborne illness were recorded in the past decade.

Another factor is globalization of the food supply. While testing programs don't show widespread contamination of produce, a significant percentage is imported: 35 percent of fresh fruits and 10 percent of fresh vegetables. In addition, 62 percent of fish, fish products, and shellfish are imported.

Another environmental factor of concern is safe handling of animal manure. Dr. Liang noted that there are real problems dealing with the glut of animal manure produced in the U.S. CDC's FoodNet case-control data shows that *E. coli* O157 and *Campylobacter* have been transmitted through contact with farm animals, and by living on or visiting a farm. In addition, *E. coli* O157 has been transmitted through gardening and direct and indirect contact with manure. "Direct contact with manure can be a problem," Dr. Liang said.

But in spite of these challenges, significant progress is being made in the war on pathogens, Dr. Liang maintained. "We are getting better at recognizing outbreaks and what causes them. We are improving surveillance and our ability to detect these problems. To some extent, these problems were out there and invisible, and we are just getting better at recognizing them," he said.

Dr. Liang described CDC's PulseNet, which provides DNA "fingerprinting" of pathogens. "It is allowing us to see the invisible. If you have a common organism like *Salmonella*, you can actually fingerprint the *Salmonella* so you can recognize a cluster of activity that might otherwise have been missed behind all the other background. It also aids in the investigation. You actually can match the patient's isolates to the food, and then find the same *Salmonella* in the factory," he explained.

The CDC is also exporting technology to State labs to aid in the identification of Norwalk virus and enable more rapid response to outbreaks. "The Norwalk virus is one of the hard problems because there is no industrial fix," he said, noting that, "if there is no industrial fix, then educators are the fix or final barrier preventing illness."

Real progress is also being made in improving food safety as a result of improvements in Federal inspection and regulations, as implementing Hazard Analysis and Critical Control Point systems, innovative technologies, hygienic processing, water chlorination, and food safety education.

Even with the decline in the number of foodborne illnesses, Americans continue to suffer from foodborne pathogens. The CDC esti-



mates that 76 million cases of foodborne illness occur annually, resulting in 323,000 hospitalizations and 5,000 deaths. That means that 1 in 4 Americans develops a foodborne illness every year and 1 in 1,000 is hospitalized. The overall cost to society is \$6.5 billion a year, equivalent to the CDC's annual budget, Dr. Liang said.

While Norwalk-like viruses are the most common cause of foodborne illness, bacterial pathogens remain the leading cause of death. *Salmonella* is the leading cause of death from foodborne illness, 31 percent. It is followed by *Listeria*, 28 percent; Toxoplasmosis, 21 percent; Norwalk-like viruses, 7 percent; *Campylobacter*, 5 percent; *E. coli* O157:H7, 3 percent; and Other, 5 percent.

"Food is produced, distributed, and prepared in a very complex web—and we are always exposed," Dr. Liang said in conclusion. "So even if a single meal is of a relatively low risk, over a lifetime you have to consider how many meals you eat. Basically, everyone has to do everything right every time."

In the "war" with microbes, Dr. Liang said, microbes have unique advantages. "We need to respect the microbes. They can rapidly adapt, even by the hour. And they have a 3.5 billion year head start on people. But that's where you come in," he said, because "the unique human adaptability is the transfer of information and learning from the past."

"The world is counting on you," he added. "And once you start, you can't stop. Because the 'bugs' will catch up with you. Are you up to the challenge?"

## **Panel: What They Say They Do...What They Actually Do: New Data About Consumer Behavior and Food Handling and What It Means for Educators**

### **Introduction**

**Christine Bruhn, Ph.D., University of California, Davis,  
Moderator**

"One of the factors I have always considered when communicating to the public is that the first step in communicating is listening. Listening to hear what consumers have to say; listening to hear what they think. I believe after this program we are going to find that listening isn't enough. Actually we need to watch, also, to see what consumers do. And we need to try to understand what has led to their actions."

**Alan Levy, Ph.D., Center for Food Safety and Applied Nutrition, Food and Drug Administration—Cognitive Antecedents of "Good" Food Safety Practices**

Dr. Alan Levy is the senior scientist in the Consumer Studies Team at the Center for Food Safety and Applied Nutrition at the Food and Drug

"One of the factors I have always considered when communicating to the public is that the first step in communicating is listening. Listening to hear what consumers have to say; listening to hear what they think. I believe after this program we are going to find that listening isn't enough. Actually we need to watch, also, to see what consumers do. And we need to try to understand what has led to their actions."

*Christine Bruhn*



"Consumers practice safe food behavior when they perceive a direct risk to themselves. General risk information is not enough," he said.

*Dr. Alan Levy*

Administration (FDA), where he works on labeling, education, and consumer communication issues. Prior to coming to FDA, he taught Social Psychology at Duke University and conducted public policy research for other government agencies. He is currently working on a number of food safety projects, as well as dietary supplement labeling issues.

"Trends in reported safe food handling behaviors on the part of consumers are remarkable both in the magnitude of improvement and because of their sudden onset," reported Dr. Alan Levy. He bases his conclusion on the FDA/USDA Food Safety Surveys of 1988, 1993, 1998, and 2001.

The data is based on answers to a detailed questionnaire administered through a nationwide telephone survey to 4,500 adult consumers.

"Consumption and handling practices began to improve greatly in 1993. Since then, improvement has continued for consumer handling practices and has been sustained for consumer consumption practices," he said.

These improvements, according to Levy, are evidence that the average person has a greater understanding of food safety. "This in turn must be due to the effectiveness of the information, messages, and the coverage of food safety stories that have inundated the public in the past few years," he said.

At the same time, research also indicates that knowledge doesn't necessarily translate into action, Levy reported. The single most important factor affecting consumer behavior, he said, is consumers' perception of risk. "Consumers practice safe food behavior when they perceive a direct risk to themselves. General risk information is not enough," he said.

Another thought-provoking conclusion Levy offered: Consumer knowledge and awareness of foodborne illness and pathogens can work against them. Why? Because consumers can become overconfident. They have mistaken ideas about risks and remedies and erroneously believe they can manage the risks, Levy explained. They also have erroneous ideas about how to execute safe food handling practices—for instance, how to correctly wash hands or surfaces like countertops.

In light of these findings, Levy advised educators to "challenge consumer complacency, emphasize individual risks, and provide 'practice specific' information about how to handle food safely."

In his presentation to conference attendees, Levy explained the survey design, as well as details of the survey's results and assessments. Levy noted that the data allow for the interrelationships among all the different measures to be controlled during the analysis to determine those factors most directly responsible for whether a person reports good food safety practices. As a result, the data allow researchers to identify the "cognitive antecedents of good food safety practices"—in other words, the factors that influence behavior change. From that, educators can develop more effective messages.



The survey measured a number of specific food safety practices and obtained information on the respondents—including demographic characteristics, food choices, cooking experience, food safety knowledge, attitudes, risk perceptions, and sources of food safety information.

Levy reported that the survey included questions on three separate measures of good food safety practices:

- **Clean and separate:** Questions asked respondents how they washed their hands and cutting boards before starting meal preparations or after handling various kinds of raw foods.
- **Cook:** Respondents were questioned concerning eating raw or undercooked protein food—including shellfish, hamburger, and eggs.
- **Chill:** Several questions were asked regarding cooling practices including how long, if at all, respondents left certain foods out of the refrigerator.

In addition, survey questions covered other variables. Consumers were asked about their:

- Status as a meal preparer in the home, whether there are young children under 5 years old in the home, and whether respondents report that someone in the home had a foodborne illness experience in the past year;
- Knowledge of six microbial pathogens;
- Perceptions of risk of foodborne illness in today's world, and how much risk they believe they personally take when they fail to follow specific food safety practices; and
- Information sources concerning foodborne illness. They were also queried on their awareness of the USDA safe handling label on meat and poultry products, whether they could correctly remember any of the messages from the label, and if they had changed their behavior after reading the message on the label.


The survey results, Levy explained, control for demographic characteristics, respondents' patterns of food choices, and the joint effects of all the other cognitive variables on the dependent variables. "What remains," he said, "is the direct effect, due to a given cognitive variable, on the specific good food safety practice. This is the pure, direct effect, unmediated by any other variable in the analysis." This allows researchers to identify factors that directly influence consumer behavior.

The results, according to Levy, support the conclusion that the key factor influencing consumer behavior is their individual perception of risk. Survey questions regarding behavior and risk were the most likely to yield a strong link to good food safety practices.

For example, he said, how consumers answer the question "How likely are you to get sick if you forget to wash your hands before you begin cooking?" is a good predictor of respondents' food handling practices.

In light of these findings, Levy advised educators to "challenge consumer complacency, emphasize individual risks, and provide 'practice specific' information about how to handle food safely."





On the other hand, knowledge about foodborne illness and pathogens was inversely related to safe food handling, Levy said. In fact, Levy pointed out, the profile of the consumer least likely to worry about their safe food handling practices matches the consumer who is most knowledgeable. "They have more experience in the kitchen, are more educated, and more knowledgeable about food safety. They are confident they are handling their food safety risk. These people express complacency, not because they don't know about the risk, but because they feel confident they are effectively managing the risk," he said.

Other surprising results:

- Views about foodborne illnesses as a general problem in society are not predictive of safe food handling behavior.
- Having children does not positively relate to safe food handling practices.
- A recent foodborne illness experience does not lead to good food safety practices and, in fact, these respondents appear more likely to eat raw or undercooked protein foods.
- Knowledge of the most common pathogens also does not translate into safe food handling practices.

Levy said the research clearly shows that, "Consumers practice safe food behavior when they think about it. They think about it when they perceive a risk, but may not perceive a risk if they are confident they are controlling their risk. And, they may have mistaken ideas about which practices are effective at reducing risks."

The implications of this research provide direction to educators. "We need effective education that challenges undue complacency," Levy said. "Practice-specific information is likely to work better than general information. And we need to challenge consumers' assurance that they know what they are doing."

### **Panel: What They Say They Do...What They Actually Do: New Data About Consumer Behavior and Food Handling and What It Means for Educators**

*Patricia Kendall, Ph.D., R.D., Extension Specialist, Colorado State University—Food Safety Behavior of Nutrition Program Graduates: Do They Do What They Say They Do?*

Dr. Patricia Kendall's research and outreach work focuses on communicating with consumers about health risks, particularly risks associated with the safety of the food supply. The author of more than 100 publications for scientific and lay audiences and more than 2,000 newspaper columns on food and nutrition topics, she has held a variety of positions at the Department of Food Science and Human Nutrition at Colorado State University. For the past few years, as an Extension Specialist at Colorado State University, she has collaborated with Extension Specialists in Ohio and Washington to research projects designed to better understand food safety behaviors of importance to targeted audiences and evaluation processes that can be used with confidence. Dr. Kendall holds a Ph.D. in Nutrition Education from Colorado State University.



Patricia Kendall, professor and extension specialist at Colorado State University, reported on a unique research project designed to develop valid instruments for assessing the impact of food safety instruction on actual food handling. To do that, the researchers provided food safety instruction followed by observational research—and then measured how consumers' actual food handling compared to their self-reported behaviors.

The research was part of a larger study supported by a grant from the Cooperative State Research, Education, and Extension Service of the U.S. Department of Agriculture. One of the goals of their research was to identify high risk behaviors that should be targeted for future food safety education efforts.

Working with Lydia Medeiros from Ohio State University and Val Hillers from Washington State University, Kendall and colleagues first surveyed food safety experts to achieve a consensus on the behaviors to be studied. Based on those behaviors, instruction was then provided to 50 low-income consumers enrolled in nutrition education classes. These consumers were then tested on their knowledge and, finally, observed while preparing food at a community kitchen.

So, after having been provided instruction on safe food handling, how safe were these consumers' food handling practices? How well did their self-reported behaviors correlate to their actual behaviors? And what were their riskiest food handling behaviors?

"This group did very well," noted Kendall, pointing out that the participants knew they were being videotaped. "Ninety-two percent of them did wash their hands and did do it correctly before they began food preparation." Participants also knew that they needed to clean utensils and cutting boards to avoid cross-contamination.

And while most participants did not use a thermometer, almost all cooked the foods to adequate temperatures: 90 percent cooked chicken breast to 160 °F. However, knowledge about how to use food thermometers was definitely lacking, Kendall reported.

But, the riskiest behaviors involved cross-contamination. More skills are needed in this area, Kendall said. Consumers aren't aware of the importance of *correctly* washing their hands after handling raw foods, like poultry and meat. For instance, when observed, 74 percent of consumers did not wash their hands correctly after handling raw chicken.

Consumers also need more information about cleaning countertops before and after food preparation—98 percent didn't clean the countertops before food preparation and 76 percent didn't clean correctly after preparing food.

In explaining the research project to conference attendees, Kendall noted that their first step was to reach consensus on risky food handling behaviors. To do this, the researchers worked with 40 food safety experts, including food microbiologists, food epidemiologists, food safety educators, and food safety policy makers. With input from the food safety experts, researchers identified 29 behaviors and

"This group did very well," noted Kendall, pointing out that the participants knew they were being videotaped. "Ninety-two percent of them did wash their hands and did do it correctly before they began food preparation."

*Patricia Kendall*



"We asked them to prepare a chicken breast to their own recipe and to their desired doneness, then slice an apple to go with the chicken," she said. "Then they were asked to cook a hamburger to their desired doneness and slice a tomato to go with the hamburger."

then developed survey questions designed to shed light on these behaviors.

The questions were grouped as follows:

- practice personal hygiene (5 questions),
- cook foods adequately (12 questions),
- avoid cross-contamination (7 questions),
- keep foods at safe temperatures (12 questions), and
- avoid foods from unsafe sources (16 questions).

Kendall and her project team then targeted 30 to 60 minutes of food safety education to low-income consumers already enrolled in food and nutrition programs. About a week after completing the training, the participants answered the food safety questionnaire to test their knowledge.

Fifty class members who were the primary food preparers were then recruited to take part in a cooking methods study, according to Kendall. Participants were provided with food, equipment, and recipes and then observed as they prepared the food in a community kitchen.

"We asked them to prepare a chicken breast to their own recipe and to their desired doneness, then slice an apple to go with the chicken," she said. "Then they were asked to cook a hamburger to their desired doneness and slice a tomato to go with the hamburger."

The specific behaviors monitored during the observational study were:

- washing hands before food preparation, avoiding cross-contamination;
- thoroughly rinsing fruits and vegetables;
- washing hands and utensils with soap and water during preparation;
- cleaning food preparation surfaces; and
- cooking food adequately.

Following the cooking session, participants then participated in an in-depth interview during which researchers queried them on their food handling at home.

Additional specific findings from the study include:

- 92 percent correctly washed their hands before preparing food, 4 percent did not wash their hands correctly, 4 percent did not wash their hands—this correlates to their self-reported practices and responses to the questionnaire with a 92 percent agreement.
- 24 percent correctly washed their hands after handling raw chicken; 74 percent wiped or rinsed their hands, but did not wash them correctly—this represents 94 percent agreement with the responses to the questionnaire if incorrect



handwashing attempts were included and 18 percent agreement if they were not.

- 76 percent washed the cutting board used for the chicken before cutting the apple—this represents 83 percent agreement with the responses to the questionnaire.
- 74 percent thoroughly rinsed the fresh fruit and vegetable under running water—this represents 68 percent agreement with the responses to the questionnaire.
- 2 percent cleaned the countertops with hot, soapy water before preparing food; 98 percent did not clean at all—this represents 12 percent agreement with responses to the questionnaire.
- 76 percent incorrectly cleaned the countertops after preparing food; 18 percent didn't clean at all; 6 percent cleaned correctly—this represents 76 percent agreement with responses to the questionnaire.
- 18 percent used the thermometer to determine if the chicken breast was cooked adequately; many that did try to use a thermometer stopped when they realized they did not know how to use the thermometer—67 percent agreement with the questionnaire.
- 90 percent cooked the chicken breast to 160 °F even without a thermometer.

### **Panel: What They Say They Do...What They Actually Do: New Data About Consumer Behavior and Food Handling and What It Means for Educators**

*Janet Anderson, M.S., R.D., Utah State University—What Consumers Say They Do...What They Actually Do: A Comparison*

A Clinical Associate Professor in the Department of Nutrition and Food Sciences at Utah State University, Ms. Janet Anderson's primary duty is teaching in the Coordinated Program in Dietetics where she is responsible for teaching quantity foods production and food service management courses, with an emphasis in school food service and health care food service. A Registered Dietitian with experience in managing food service operations, she has expertise in retail food safety and teaches the Utah State University Extension Food Safety Manager Certification courses via satellite to food service managers throughout the state of Utah. Ms. Anderson also is the Director of the Safe Food Institute, the mission of which is to research consumer behavior and develop effective educational messages and materials based on scientifically valid data.

"From our research, consumers are not doing what they say they do in terms of handling food safely," said Janet Anderson, Clinical Associate Professor in the Department of Nutrition and Food Sciences at Utah State University. Working with support from the Food and Drug Administration, Anderson is one of the first U.S. researchers to use observational techniques to see how consumers are actually handling food in their kitchens—and to compare those results to the behaviors consumers report on surveys.



"From our research, consumers are not doing what they say they do in terms of handling food safely."

*Janet Anderson*

According to Anderson, the discrepancy may exist for a number of reasons: consumers are simply not aware of how they are handling food, they forget what they do, or they answer surveys in "ways they think are appropriate."

Anderson's insights are the result of research that she has been conducting for the past several years.

Anderson enlisted 122 consumers in a 2-phase project purportedly designed to "test recipes" in their homes. "The consumers were unaware of the food safety purpose of the study," said Anderson, noting that participants were told the purpose of the study was to conduct market research on food preparation practices. In fact, that was the original intent of the study, she said, until researchers saw the videotapes and the lack of food safety practices.

Participants received a bag of groceries and recipes for a salad and either a beef, chicken, or fish entrée, explained Anderson. They were asked to put the groceries away as they normally would and then to prepare the recipes. Three small wireless cameras strategically placed in the participants' kitchens recorded the actions of participants' hands. After the meal was prepared, a survey was administered to the participants asking them about their safe food handling practices. The videotapes were coded for food safety behaviors using the four steps of the Fight BAC!® recommendations—clean, separate, cook, and chill.

Comparing consumers' survey responses to the videotapes revealed some significant discrepancies between what people reported they did in the kitchen and what they actually did. As Anderson noted, "Surveys are good for assessing consumer food safety knowledge and attitude, but we need observational methodologies to really assess consumers' food safety behavior."

Before highlighting the results, Anderson cautioned her listeners to "keep in mind that if someone is going to come into your home with video cameras, you are going to be on your best behavior. And your kitchen is going to be clean. We even had people dusting their refrigerator as we walked up to the front door. So, keep in mind they are on their best behavior."

Some of the highlights of discrepancies between what consumers say and what they do:

#### **How often do you wash your hands with soap before preparing food?**

Sixty percent of consumers say they wash their hands all of the time.

But what do consumers really do?

Fifty-two percent did wash their hands. "But," says Anderson, "how many of these were actually effective? To some extent, many were just putting their hands in water." Thirty-two percent washed with



cold water and soap. Only 2 percent actually washed correctly, with hot water, soap, and agitation.

### **How long should you spend washing your hands before preparing food?**

On average, consumers said almost a whole minute: 56 seconds.

But what did they actually *do*? The average time actually spent "washing" was 7 seconds.

### **What do you know about cooking ground beef and chicken?**

Some issues just continue to confuse consumers, like final cooking temperatures.

Only 9 percent reported the correct temperature of 160 °F for ground beef. Only 3 percent reported the correct temperature of 170 °F for chicken breasts. Their responses ranged from 100 to 500 °F.

And the results of that confusion showed up in the cooked entrees. Forty-six percent of consumers undercooked the ground beef; 82 percent undercooked the chicken entree.

**Other disturbing observations:** the dad who wiped up a spill from a raw chicken and then turned around and wiped the baby's face with the same towel; and consumers who tasted the ground beef entree to see if it was "done."

**One bright spot:** 99 percent of consumers correctly reported that it was risky to serve the cooked entree on the same platter that had been used for raw meat or poultry. And—none of the observed subjects served the cooked food on the same plate that held the raw food. Also on the positive side: while only 29 percent of consumers said they stored cooked food in shallow containers, when observed, 48 percent actually put their food in shallow containers.

**Some additional discrepancies** highlighted by comparing consumers' survey responses to behavior observed on the videotapes:

### **Is NOT washing your hands after handling raw eggs a risky behavior?**

*Survey:* 75 percent said this is risky behavior.

*Observation:* 60 percent failed to wash their hands after handling raw eggs in the preparation of recipes.

### **How do you know when hamburgers are done?**

*Survey:* 64 percent reported they cut the meat, 19 percent used the color of the juice, 8 percent looked at the outside, 3 percent cooked for a certain time, 1 percent used a thermometer.

*Observations:* 30 percent cut the meat with a knife, 34 percent used a utensil on the surface to extract juice, 58 percent looked at the outside, 0 percent cooked for a certain time, 3 percent used a thermometer, 7 percent tasted the meat.

Fifty-two percent did wash their hands. "But," says Anderson, "how many of these were actually effective?"



### **How often do you use a thermometer when cooking?**

*Survey:* 10 percent reported always, 10 percent often, 35 percent occasionally, 41 percent rarely, 3 percent never.

*Observations:* Only 3 percent used any temperature indicator device and only 1 person used the thermometer properly.

### **To what internal temperature should ground beef be cooked?**

*Survey:* responses ranged from 100 to 500 °F. Only 9 percent accurately reported 160 °F.

*Observations:* 46 percent undercooked the ground beef entrée and the final cooked temperature of entrees ranged from 129 to 197 °F.

### **To what internal temperature should chicken breast be cooked?**

*Survey:* responses ranged from 100 to 500 °F. Only 3 percent reported the correct temperature of 170 °F.

*Observations:* 82 percent undercooked the chicken entrée and the final cooked temperature of entrees ranged from 132 to 191 °F.

### **What do you use most often to clean your countertops in your kitchen?**

*Survey:* 76 percent dishcloth, 14 percent sponge, 10 percent paper towels.

*Observations:* 46 percent contaminated cloth, 26 percent cloth, 10 percent contaminated sponges, 7 percent sponges, 7 percent paper towels, 2 percent scrub brushes.

### **How would you store a large pot of soup or stew?**

*Survey:* 35 percent reported they would store in a large, deep container with a cover; 33 percent said original pot; 25 percent said small, shallow containers with covers; 4 percent said small shallow containers without covers; 3 percent said a large, deep container without cover.

*Observations:* 23 percent stored leftover entrée in original cooking container; 7 percent in a large, deep container; 48 percent in shallow container; 23 percent with a cover. (A third of the refrigerators in the study had temperatures over 40 °F.)

### **Panel: What They Say They Do...What They Actually Do: New Data About Consumer Behavior and Food Handling and What It Means for Educators**

*Sheryl Cates, Research Triangle Institute International—Changes in Consumer Knowledge, Behavior, and Confidence Since the 1996 PR/HACCP Final Rule*

Ms. Sheryl Cates is a Research Business Analyst in the Food and Nutrition Policy and Consumer Behaviors Program at RTI International where she



manages studies funded by the USDA, FSIS, and FDA on food safety issues. She conducts research to design and evaluate consumer education programs and labeling messages, and to evaluate changes in consumer practices as a result of education initiatives and food safety labeling. Ms. Cates employs both qualitative and quantitative research methods, including focus groups, in-depth interviews, telephone surveys, and web-enabled panel surveys. Ms. Cates has published in the *Journal of Food Protection and Resource* and *Energy Economics*.

How have consumers' food safety knowledge and behavior changed since 1996?

Sheryl Cates of the Research Triangle Institute (RTI) tackled this question for the U.S. Department of Agriculture's Food Safety and Inspection Service (FSIS). In searching for answers, Cates surveyed a wide variety of existing consumer research conducted from 1993 through 2000 and conducted a series of new focus group research.

Her research specifically sought to assess changes in consumer knowledge and reported use of safe food handling practices and confidence in the safety of meat and poultry since the 1996 FSIS Pathogen Reduction/Hazard Analysis and Critical Control Point rule.

One reason this research is significant is because it tracks changes in consumer behavior over a period of years and summarizes research conducted by a wide variety of organizations, including Federal agencies, industry, and academe. Research methodologies included surveys, focus groups, and observational studies.

In addition, Cates' research included new focus group research, which was "very valuable in helping us understand the 'why' behind changes in consumer knowledge and confidence. It also raised questions about just how well people were following through on their actions," she explained.

Cates' findings echoed concerns voiced by other researchers: Consumers are more confident in the safety of meat and poultry. They are also more confident in themselves. But despite knowledge and good intentions, consumers may still be making some significant mistakes when it comes to handling food safely.

Her examination of existing research confirmed that consumers are more knowledgeable about pathogens. In fact, 93 percent of consumers are aware of *Salmonella* and 88 percent of consumers are aware of *E. coli* O157:H7. Consumers also understand that pathogens can be destroyed by cooking.

At the same time, observational studies and focus group research cast doubt on the impact of this knowledge.

"In focus groups, consumers tell us they are very concerned about food safety, so they take precautions when cooking at home to protect their family from foodborne illness. They also express confidence in their ability to safely handle meat and poultry," Cates said.

In addition, Cates' research included new focus group research, which was "very valuable in helping us understand the 'why' behind changes in consumer knowledge and confidence. It also raised questions about just how well people were following through on their actions," she explained.

*Sheryl Cates*



"In focus groups, consumers tell us they are very concerned about food safety, so they take precautions when cooking at home to protect their family from foodborne illness. They also express confidence in their ability to safely handle meat and poultry," Cates said. "But in discussions about their actual practices, they reveal that they sometimes follow some unsafe practices."

"But in discussions about their actual practices, they reveal that they sometimes follow some unsafe practices."

In addition, focus group research revealed that consumers are frequently confused about who faces increased risk of foodborne illness. Most people are not aware that pregnant women are a high-risk group, Cates reported. Many seniors also did not recognize their risks. In a focus group made up of seniors 60 and older, "they didn't see themselves as high risk. They felt people at risk were seniors 80 and older," Cates revealed.

Consumers also continue to believe, mistakenly, that most foodborne illness originates in food processing plants or restaurants, as opposed to their own homes.

And while consumer awareness of most pathogens has increased significantly, awareness of *Listeria* remains low. (At the same time, awareness of *Listeria* has nearly tripled from 1993 to 2001, increasing from 9 percent to 31 percent.)

And how do consumers rate the government's performance? While they feel the government is doing an adequate job, they don't think it has improved its performance in the past 5 years. They do feel that media scrutiny, however, is effective.

"Consumers tell us that they get a lot of information on food safety from the media, from local television news, and from television news shows and cooking programs," said Cates. "They report that hearing about food safety in the media has made them more knowledgeable, so they have improved their safe food handling practices." In addition, consumers say that media coverage of food safety problems, such as recalls or re-wrapping and re-dating meat products encourages manufacturers to "clean up their acts," making consumers feel more confident in the safety of the products, according to Cates.

Also on the plus side, while regular use of food thermometers remains relatively low, more consumers own them and use them. While consumer use of food thermometers to check small cuts of meat remains low, it also doubled between 1998 and 2001. Approximately 12 percent of consumers now regularly use a food thermometer to check small pieces of chicken; 6 percent use it to check their hamburgers. Thirty-two percent use a food thermometer to check a roast. And, the number of people owning a food thermometer has increased from 46 percent to 60 percent.

In general, Cates reported, her research indicates consumers need more guidance concerning:

- using food thermometers,
- safely storing leftovers, and
- safely thawing meat and poultry.

Specifically,

- Consumers report that they cook meats longer, particularly hamburgers, because of safety concerns. They rely on a variety

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of methods for testing the doneness of the meat and poultry, with color mostly used as an indicator of doneness. In focus groups, consumers indicate they are not generally aware of the quality, as well as safety, benefits of using a food thermometer.

- Only about 25 percent of consumers safely store large amounts of leftovers within 2 hours in shallow containers, she reported. Focus group findings also suggest that consumers are unaware that perishable foods should be refrigerated or frozen within 2 hours. About half of consumers still thaw meat and poultry on the countertop.
- Only 33 percent of consumers own a refrigerator thermometer and only 40 percent are aware of proper refrigerator temperature.
- According to surveys, consumers seem to have a good understanding of cross-contamination and are following practices that keep raw meat and poultry separate from food that will not be cooked. They also are more careful to use separate cutting boards. Focus group research, however, suggests that in reality, consumers may not always follow these practices. Consumers are also not as conscientious about keeping meat and poultry products separate from other foods while grocery shopping or storing foods in the refrigerator.

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"The most important tool in the kitchen is the human brain—and the best advice to consumers may be to think more about their actions."

*Dr. Christopher Griffith*

### **Panel: What They Say They Do...What They Actually Do: New Data About Consumer Behavior and Food Handling and What It Means for Educators**

*Christopher Griffith, Ph.D. University of Wales Institute Cardiff, United Kingdom*

Professor Christopher Griffith has lectured on aspects of medical and food microbiology for more than 20 years and been involved in food safety research for 18 years, including 12 years of consumer-based research. As Head of the Food Research and Consultancy Unit and Director of Enterprise and Development for the School of Applied Sciences at the University of Wales Institute, Cardiff, he is involved with food safety at all points within the food chain. He has authored/co-authored more than 150 books, book chapters, scientific papers, and conference proceedings related to food safety, including the How To series of books, the most recent of which is *How to Clean—A Management Guide* and *How To HACCP*, 3<sup>rd</sup> Edition. Dr. Griffith has received a number of international awards, including a New Zealand ESR international research fellowship in 1999 and a Welsh National Assembly Award in 2002.

Dr. Christopher Griffith, professor in food safety at the University of Wales Institute, Cardiff, observed that, based on his research, "the most important tool in the kitchen is the human brain—and the best advice to consumers may be to think more about their actions."

In addition, Griffith suggested that future consumer research needs to address new issues, such as the microbiological risks associated with specific behaviors.





Griffith noted that about 85 percent of the studies concerning consumers' food handling practices have taken place since the mid-1990's, primarily in the United States and the United Kingdom. "At that time, we suddenly realized that consumer food safety does require some attention," he said, adding that conferences on food safety give credibility to consumer studies and aid in the establishment of consumer food safety research as an appropriate scientific discipline.

From a recently published review analyzing 88 consumer research studies, Griffith noted that surveys were the most popular form of research. Most data has been collected "on consumers' knowledge about various aspects of food safety and how consumers practice food safety based on self-reporting. There has been less work done on people's attitudes toward particular elements of food safety and the actual practices they use," he said.

"At first we needed to study consumers because we didn't know what their beliefs were. Now we are getting a body of knowledge and can identify trends. Our next step is to take the research forward to quantitative risk assessment—what really happens in the kitchen and what are the consequences? This needs then to be linked to cost-benefit analysis and educating the consumer to achieve behavioral change. In Cardiff, we are currently using social marketing to try to achieve this," he said.

"The United States is carrying out some very large studies on quantitative risk assessment, but one of the weaknesses in these studies is incorporating what happens in the kitchen of either the food establishment or the home into the risk assessment. I think this is an important issue for us to address."

Based on his observational research and exposure assessment, Griffith cited cross-contamination as a major risk factor, for certain pathogens, that needs to be emphasized. For pathogens such as *Campylobacter* (the most commonly reported cause of bacterial food poisoning in the U.K.), it is likely to be more important than undercooking or poor storage.

"It is likely to be an underreported risk factor. In outbreak investigations, people may remember that the meat was undercooked," he said, "but they won't remember if a cloth that wiped the surface where the raw meat had been was subsequently used to wipe the surface where cooked food was handled."

Another challenge facing educators, according to Griffith, is that most consumer research shows that consumers frequently misunderstand safe food handling advice. "If you talk to people and ask why they think they can have a steak rare but not a burger, they do not precisely understand the 'whys.'"

In general, Griffith observed, people may be unaware of their own actions and the risks they face. For instance, he said, "if you are trying to persuade people to improve their food handling practices, they need to be convinced that you can acquire foodborne illnesses



in the home. Unfortunately, that is the last place most people think they are going to get food poisoning."

The home is an important location for contracting foodborne illness, he said, making consumer food preparation practices critical. Like his American counterparts, Griffith concluded that there is a poor correlation between knowledge and actual behavior. Some of his other findings:

**"Most people know to wash their hands,"** he said, and that is a positive finding. "But when you work with focus groups, things start to change. You get statements like: 'I just rinse them under the water' or 'I wipe them on the towel.' They know what to do, but they don't always understand how to do it, why they should do it, or when."

**Another problem is hand-towels.** "We have actually picked up that hand-drying towels are one of the better places to recover pathogens in the kitchen. People handle raw poultry and then put their hands under the tap. They get their hands nice and wet and then they rub them with the towel, applying mechanical pressure. So these pathogens have moisture and mechanical energy—a beautiful way to transfer pathogens from the hands to the towel."

**Cleaning** is a related area where consumers have good intentions, but lack knowledge and skills—and end up facing risks of foodborne illness, he said. "People base cleanliness on a visual assessment. But if you use a microbiologically contaminated wet cloth (i.e., the average dishcloth) to wipe a visually dirty surface, you might make the surface look cleaner, but you increase the microbial contamination level very significantly. It's not uncommon for surfaces to be more contaminated after cleaning than before." Griffith noted that part of the problem with cleaning habits is that many people get instructions on cooking from their parents, but few get instructions about cleaning—either surfaces or food products.

Another example: Griffith questioned a common consumer practice of rinsing out the carcass of poultry before cooking. "They put it under the tap," he said, "which spreads pathogens around the sink and kitchen areas. When you ask them why they do it, they say it is to get the 'muck' out. They think they are doing something right, but in my view, it is counterproductive and the wrong thing to do."

To read more about Griffith's research projects in Cardiff, see *Journal of Food Protection*, "Consumer Food Handling in the Home: A Review of Food Safety Studies," January 2003; and *International Journal of Consumer Studies*, "A Comparison and Evaluation of Research Methods Used in Consumer Food Safety Studies," January 2003. Both of these were written in conjunction with Dr. E. Redmond.

### **Panel: What They Say They Do...What They Actually Do: New Data About Consumer Behavior and Food Handling and What It Means for Educators**

Following the presentations, two designated "reactors" summarized their impressions:

"At first we needed to study consumers because we didn't know what their beliefs were. Now we are getting a body of knowledge and can identify trends. Our next step is to take the research forward to quantitative risk assessment—what really happens in the kitchen and what are the consequences?..."



"Our challenge as educators is two-fold: incorporate messages within our educational programs that motivate people to handle food safely and find evaluation tools that we can stand behind so we can say our programs are making an impact."

*Angela Fraser*

#### **Val Hillers, Ph.D., R.D., Washington State University**

Val Hillers acknowledged that the consumer behaviors educators are trying to change are complex. "I think that we have tended to think of these behaviors as fairly simple," she said. Educators have given consumers simple messages, "when clearly consumers don't understand how to perform these behaviors properly. I think we need to get much more detailed," she said.

Hillers said she was "interested in Dr. Levy's remarks that risk perceptions are important to understanding why consumers do what they do. My next challenge area is [finding] an appropriate message where people understand the risk and how they can control the risk without getting complacent. I need to think about this a lot."

She also noted that the research points to two behaviors as "the most important: personal hygiene and cross-contamination. These are also probably the hardest behaviors to teach.... We have lots of work collectively to do."

Noting the large to-do list facing educators, Hillers also called on food equipment engineers and manufacturers to pitch in and build in food safety tools. One example, she suggested, is refrigerators. "Why can't refrigerators have built-in thermometers? Then people could set the thermometer at the correct temperature and we wouldn't have to go to all the work of telling people to buy a thermometer. And consumers wouldn't have to figure out what a '7' means on the refrigerator dial!"

#### **Angela Fraser, Ph.D., North Carolina State University**

"It is very evident that people are not handling food safely," said Angela Fraser, referring to the findings of the consumer panelists that revealed problems with consumer handwashing, cooking, and cleaning skills. "We have to realize that simply sharing a message about what to do is not necessarily going to lead to a decreased incidence of foodborne illness. We have to figure out ways to motivate consumers to apply appropriate safe food handling practices," she said.

Fraser also suggested that educators need to focus more on making consumers aware that they are at risk for foodborne illness. "A lot of times they will say, 'I am not at risk. Prove it. Prove to me that I am at risk,'" she said referring to her work with older adults. "We need to do a better job of convincing the public that they are at risk. I think this is probably our first step."

Fraser also challenged her fellow educators to improve the quality of the tools they use to evaluate the impact of their education programs. "A lot of us develop tools that are not sound, that are not valid, and that are not reliable. I recommend to all educators that when you evaluate your program, consider the soundness of your instrument. The more credible your evaluation instrument, the more confident you will be that the information you share with stakeholders about program effectiveness is true."



"Our challenge as educators is two-fold: incorporate messages within our educational programs that motivate people to handle food safely and find evaluation tools that we can stand behind so we can say our programs are making an impact."

## Food Safety Education: The Victims' Perspective

### *Nancy Donley, Safe Tables Our Priority*

Safe Tables Our Priority (STOP) was founded by Ms. Donley in 1994 following the death of her son, Alex, from illness caused by eating a hamburger contaminated with *E. coli* O157:H7. Members of STOP have all had personal encounters with foodborne illnesses. Ms. Donley described STOP members as "actionists" who work with government and industry to prevent needless tragedies from foodborne illness.

"Education alone is not the answer to preventing foodborne illness. The answer is to keep pathogens out of the food to begin with. Everyone in this room has had an episode of foodborne illness," said Nancy Donley, President of Safe Tables Our Priority (STOP). "Even the most knowledgeable still get sick," she said.

While Donley feels that education by itself isn't the answer, she feels it has a role. In fact, STOP has recently added an outreach coordinator.

But Donley objects to a concept that she believes can accompany education: "If you get sick, it's your own fault." Food needs to be uncontaminated in the first place, she said. "And we need to apply the Hazard Analysis and Critical Control Point approach to the whole farm-to-table continuum. The fact that there are no on-farm controls is a serious oversight," she said.

Donley also noted that consumers face mixed messages from government agencies. "We tell them we have the safest food supply in the world, so they don't see a problem. They have a false sense of security. Another example: Why should consumers cook hamburger to 160 °F at home when the restaurants tell them they'll cook it any way they want it. It's confusing to consumers. And we still haven't beaten the 'pink' message. People still mistakenly think they can judge the safety of their food by the color."

Another problem that Donley sees is that consumers still don't understand who faces special risks from foodborne illness. "The public is unaware of who is at risk—young children, pregnant women, the elderly, and the immune-compromised. They have no idea of their added vulnerabilities. All education messages should reinforce who is especially vulnerable," she said.

Donley strongly supports education campaigns, such as Fight BAC!® and the Food Safety and Inspection Service's campaign to promote

"We want to reinforce the message that behind every dry statistic, there are real people, real faces, and real stories. Take our stories with you. Use them as an education tool, if you think it can help. We want to put STOP out of business."

*Nancy Donley*



the use of food thermometers. Programs for school curriculums, she said, are especially important and can help educate parents as well. "The messages need to be consistent and truthful," she said.

Explaining her organization's approach, Donley said "we want to reinforce the message that behind every dry statistic, there are real people, real faces, and real stories. Take our stories with you. Use them as an education tool, if you think it can help. We want to put STOP out of business."

### **Panel Discussion: Making It Real—Highlights from Successful Education Programs**

#### **Science and Our Food Supply: A Food Science Curriculum for Middle and High School Students**

##### ***Laura Fox, Food and Drug Administration***

Ms. Laura Fox is a member of the Food Safety Staff at the Food and Drug Administration (FDA) Center for Food Safety and Applied Nutrition where she develops food safety programs for producers, consumers, and the media, as well as education campaigns targeted at the general population, those at risk for developing foodborne illnesses, and product-specific initiatives. Ms. Fox is the project manager for two new school-based initiatives developed in partnership with the National Science Teachers Association: a middle and high school supplementary food science curriculum, *Science and Our Food Supply*, and a week-long professional development program in food science for middle and high school teachers. Ms. Fox is an FDA representative to the Partnership for Food Safety Education, a national organization dedicated to educating consumers about the importance of food safety.

*Science and Our Food Supply* is a public health education program that uses food science to teach students about reducing foodborne illness through safe food handling and introduces them to careers in food science, according to Laura Fox. Middle level and high school students were selected as the target audience for the curriculum because they often are responsible for preparing food for themselves and others and often work in the food service industry.

The curriculum program, developed jointly with the National Science Teachers Association (NSTA), is being distributed for free to science teachers throughout the country.

The unique science curriculum includes an Emmy-award winning video and teachers' guides for middle and high school students. The guides include dozens of lab experiments and classroom activities. The package also includes an 88-page publication, *Food Safety Reference A-Z Guide*. Because the program is also designed to promote interest in science careers, the *Guide* includes 16 profiles of food science professionals.



In developing successful science-oriented curricula, Fox stressed the importance of partnering with an organization with expertise in science education. In developing this program, FDA partnered with the NSTA and worked with an advisory group of middle level and high school science teachers to ensure that the curriculum was academically challenging.

The advisory teachers and FDA scientists created inquiry-based lab experiments and classroom activities to demonstrate that microbiological properties that allow foodborne bacteria to grow and spread can be effectively reduced through safe food handling practices.

The award-winning video component of the program, "Dr. X and the Quest for Food Safety," introduces and reinforces the science concepts featured in the activities and experiments.

Fox said "teachers are reporting that the *Science and Our Food Supply* curriculum package is an excellent vehicle for teaching science, capturing the students' interest, and helping teachers meet the National Science Education Standards." Teachers say the bottom line for students completing the curriculum is acquiring better food safety habits, Fox reported.

A complementary professional development program created by FDA and NSTA for middle level and high school teachers is being offered to encourage teachers to use *Science and Our Food Supply*.

Beginning in 2000, 25 middle level and 25 high school teachers came to Washington, D.C., for a week-long training program that provided them with the opportunity to hear the latest developments in food science from FDA scientists, visit research and food processing facilities, practice the lab experiments and classroom activities contained in *Science and Our Food Supply*, and exchange teaching strategies.

In exchange, the teachers agree to teach a 1-day workshop for other teachers in their local area. As of September 2002, Fox reported that 150 teachers had participated in the program and, in turn, trained another 3,750 teachers.

The program for teachers has been so successful in stimulating interest in food safety that Albertsons grocery store chain agreed to sponsor workshops for teachers in California, Washington, and Chicago.

### **Making It Real—Highlights of Successful Education Programs**

#### **Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians**

*Julia Smith, M.P.H., Centers for Disease Control and Prevention*

Fox said "teachers are reporting that the *Science and Our Food Supply* curriculum package is an excellent vehicle for teaching science, capturing the students' interest, and helping teachers meet the National Science Education Standards."

*Laura Fox*



"The purpose behind the *Primer* is to assist physicians in recognizing and managing foodborne illness—and to facilitate the flow of food safety education information to high-risk patients,"

*Julia Smith*

Ms. Julia Smith is the Associate Director of Health Education in the Centers for Disease Control and Prevention's (CDC) Food Safety Office. Her responsibilities include coordination of health education, training, and communication activities. Ms. Smith works with other Federal agencies, industry, consumer, and professional organizations to promote food safety among consumers, industry, and health professionals. Ms. Smith received her Masters in Public Health from the Rollins School of Public Health at Emory University and her B.S. in Biology from the University of South Carolina.

With studies showing that physicians are key potential partners in food safety education, the American Medical Association partnered with Federal agencies to produce *Diagnosis and Management of Foodborne Illness: A Primer for Health Care Providers*, according to Julia Smith of the Centers for Disease Control and Prevention.

More than 15,000 full-color versions of the *Primer* have been distributed, and the *Primer* has been distributed to approximately 600,000 readers as a special supplement to an issue of the CDC's *Morbidity and Mortality Weekly Report*.

Physicians are ideally positioned to serve as food safety educators, especially with at-risk populations, Smith reported. Physicians have contact with approximately 80 percent of the U.S. population during a given year. And research indicates that people seeing physicians may be more open to changing their behavior because they see themselves at risk.

A CDC survey of physicians serving patients at greatest risk of foodborne disease indicates that the physicians are concerned about foodborne disease. Eighty percent of the surveyed physicians perceive foodborne illness as a serious problem in immunocompromised patients and want to be aware of those risks. Fifty-one percent perceive their own patients at risk for foodborne illness.

These physicians also reported that they see themselves as educators. Fifty-four percent of the physicians see educating patients about foodborne illness as part of their role. Thirty percent already provide foodborne information to patients. And the remaining 70 percent of physicians want to provide information to their patients.

Studies also show that consumers value physicians over other health professionals as key sources of educational information, she said. "A nutrition study showed that education programs involving 1- to 3-minute pep talks by physicians, followed by the provision of self-help materials, are as effective as 30-minute counseling sessions from other health professionals in changing behaviors," Smith reported.

The *Primer* provides clinical considerations, patient scenarios, fold-out tables of foodborne illness information, clinical vignettes for self-evaluation, suggested reading, and a patient education handout. Physicians completing the *Primer* can take the Continuing Medical Examination (CME) for credits. An updated version will have new patient scenarios and offer CME and Certified Health Education Specialist credits. The material is available in print, or online, at <http://www.cdc.gov/foodsafety>.



Private practice physicians and those who practice in hospital clinics, along with State and local health departments and other public health officials are most likely to use the materials, according to Smith. The majority of the participants use the *Primer* as health education materials and local practice guidelines.

As of September 2002, 1,502 physicians had completed the *Primer* for CME credits and 685 have completed it for Continuing Education Unit credits.

## **Making It Real—Highlights from Successful Education Programs**

### ***Smart Kids Fight BAC!®* A Program for Grades K-3**

***Judy Harrison, Ph.D., University of Georgia***

Dr. Judy Harrison is an associate professor and extension food specialist in the Department of Foods and Nutrition at the University of Georgia. She supports the outreach mission of the College of Family and Consumer Sciences in the areas of food safety and home food preservation. She trains and supports County Extension Family and Consumer Sciences Agents, and also develops, implements, and evaluates educational programs for a variety of audiences, including materials and videos for training food handlers in child and elder care environments. Dr. Harrison also is involved in applied research examining the efficacy of various home food dehydration procedures in eliminating the risk of foodborne illness from *E. coli* O157:H7, *Salmonella*, and *Listeria*.

*"Smart Kids Fight BAC!® is a complete food safety curriculum for grades K through 3, when kids are like sponges," explained Dr. Judy Harrison of the University of Georgia.*

The curriculum program features:

- an award-winning animated video,
- activity booklets,
- teaching guides, and
- a 4-color storybook.

A clip from the animated video was aired for conference participants and confirmed the program's high fun quotient—guaranteed to appeal to the Saturday morning cartoon set.

The program was supported in part by a grant from USDA's Cooperative State Research, Education, and Extension Service. Other partners in developing the program included Mississippi State University and North Carolina State University.

Like all the curriculum materials, the 15-minute animated video, titled *Smart Kids Fight BAC!®*, demonstrates the 4 key safe food handling concepts in action: "clean, separate, cook, and chill." In the video, the elementary school's drama class puts on a play with ani-

*"Smart Kids Fight BAC!® is a complete food safety curriculum for grades K through 3, when kids are like sponges."*

*Dr. Judy Harrison*



"We wanted the storybook to be something the kids could take home and that parents would have to read 50 million times."

mated characters representing each of the 4 concepts and fighting BAC!

The activity books that accompany the video are separated for grades K-1 and 2-3. The books present a variety of activities that teach children about safe food handling while utilizing math, language arts, and science skills. The teaching guides show a step-by-step approach for delivery and use of the program.

The package also includes a four-color storybook, *He's BAC! A Children's Guide to Keeping Food Safe*. According to Harrison, the storybook can be used with the video or as a stand alone book. "We wanted the storybook to be something the kids could take home and that parents would have to read 50 million times," Harrison said.

The curriculum was tested with school children in three States—Georgia, Mississippi, and North Carolina. Cooperative extension agents worked with local teachers who presented the program to 1,200 children in grades K through 3.

Comparing these children to a control group of 1,000 students, Harrison found a positive impact for children exposed to the curriculum.

- Children in kindergarten showed a highly significant increase in knowledge of the "cook" concept and significant increases in knowledge of the "separate" and "chill" concepts.
- Children in first and second grade showed significant increases in their knowledge of all four food safety concepts, with highly significant increases in their knowledge of the "separate" and "cook" concepts.
- By the third grade, a "ceiling" effect was taking place, Harrison noted. Children already knew the correct handwashing procedure. They also knew the importance of "chill." They did, however, show a highly significant increase in their knowledge of the "cook" concept and a significant increase in their knowledge of the "separate" concept.

### **Making It Real—Highlights of Successful Education Programs**

#### **Food Safety Education Campaign in New Zealand**

*Sandra Daly, New Zealand Food Safety Authority*

Ms. Sandra Daly is the Director of Communications and Business Services for the newly established New Zealand Food Safety Authority. In this role, she is responsible for the development and implementation of communication planning, with a particular focus on providing information to consumers on food safety issues. Ms. Daly has played a leading role in the Foodsafe Partnership established in New Zealand in 1998. The partnership



is a collaboration between health providers, industry organizations, consumers, and regulators to promote food safety messages to New Zealand consumers.

"I am here working globally—with every intention of stealing your best ideas and copying your programs—thinking locally!" said Sandra Daly, Director of Communications and Business Services for the New Zealand Food Safety Authority (NZFSA).

Daly observed that her country tended to see itself as a bit different from other nations. New Zealand has a population of only 4 million and, as Daly said, "is a long way from...well...almost anywhere!

"We see ourselves as clean, green, and unpolluted. Most significantly, we have never had a serious food safety incident. To suggest that we might need a major food safety program seemed unnecessary...somewhat like suggesting woolies in Florida!"

However, in the 1990's, she reported, perceptions began to change. "We saw the headlines from overseas. We also saw increases in foodborne illness in New Zealand. We saw that geographic isolation was not enough to protect us," she explained.

New Zealand exports approximately 80 percent of the food it produces, and 50 percent of income from exports comes from food. "One serious incident in New Zealand would mean consumers in trading partner countries might avoid New Zealand products. In addition, we recognized that consumers could easily destroy the good work of our producers in their homes. We had to mitigate the risks in their homes," Daly said.

The New Zealand Food Safety Authority was formed in July 2002. It was charged with providing consistent, clear, and appropriate messages to consumers. This has been a welcome move and the Authority is now able to provide considerable support to the work of the Foodsafe Partnership. Prior to this, with no dedicated funding and few people to do the work, Daly said, the Partnership had relied on "Kiwi ingenuity and found lots of low-cost ways to give people a sense of ownership of the programs."

The first thing the Partnership did, according to Daly, was to look at the best way to deliver the message. "Shock and horror aren't successful with New Zealand consumers," she said. "Quirky, irreverent, simple messages do appeal. So we adopted the four Fight BAC!® concepts and altered them to fit our humor."

To date, they have run four campaigns that were funded by the member groups within the Partnership. The campaigns included brochures and posters that were put in student packs and carry bags, grocery stores, and camping grounds. The campaign messages also appeared as radio, television, and newspaper ads, as well as magazine articles. The campaigns ran during the summer months, which, in New Zealand, is the Christmas season.

Daly reported that program evaluations showed 85 percent of consumers recalled at least one message from the campaign and that 60 percent reported a behavior change.

"We see ourselves as clean, green, and unpolluted. Most significantly, we have never had a serious food safety incident. To suggest that we might need a major food safety program seemed unnecessary...somewhat like suggesting woolies in Florida!"

*Sandra Daly*



The newest program, Foodsafe Week, was launched December 2002 with a picnic on the Parliament grounds with the Minister of Food Safety Annette King.

Most significantly, according to Daly, they are now drafting a 5-year strategy. "After a sluggish start," Daly said, "we are on our way!"

### **Making It Real—Highlights of Successful Education Programs**

#### **"It's Safe to Bite When the Temperature is Right!": A Food Thermometer Education Campaign**

*Holly McPeak, M.S., Food Safety and Inspection Service (FSIS), USDA*

Holly McPeak is a Public Affairs Specialist with the USDA/FSIS Food Safety Education Staff. She is the project coordinator for the national consumer education campaign designed to promote the use of food thermometers, popularly known as the Thermy™ campaign. Ms. McPeak has been with FSIS for four years. Prior to her work in food safety, she was a nutritionist for the USDA's Food and Nutrition Services for 14 years, working with Team Nutrition initiatives and implementing nutrition guidance for the Child Nutrition Programs. Ms. McPeak has a M.S. in Nutrition from Drexel University, Philadelphia, PA, and a B.S. in Biology from LeMoyne College, Syracuse, NY.

#### **Thermy™ Campaign Success Stories**

In 1998, consumer and scientific research indicated consumers were risking foodborne illness by failing to use food thermometers to check the doneness of their foods, according to Holly McPeak.

A 1998 national consumer survey revealed that less than 50 percent of American cooks owned a food thermometer. And, significantly, only 3 percent of them used a food thermometer to check the doneness of small cuts of meat, like hamburgers.

At the same time, research conducted by Kansas State University and the USDA's Agricultural Research Service showed that one out of four hamburgers turns brown before it's been cooked to a safe internal temperature. The bottom line: cooking by color is misleading.

As McPeak explained to conference participants, the health consequences of undercooking can be serious. Undercooked hamburger can be a leading factor in illness caused by *E. coli* O157:H7. Children are especially susceptible to this illness, which can cause lifelong health problems, even death. As a result, the FSIS Food Safety Education Staff embarked on a campaign to educate consumers, using social marketing concepts to actually change consumer behavior.

According to McPeak, focus groups were convened to identify barriers and to test strategies for overcoming them. "The research revealed that behavior change is possible. It suggested that we target parents of young children as an audience most open to our message.

"We also found that behavior change was most likely to occur if we emphasized that using food thermometers improved food quality,"

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she said. "You don't have to turn hamburgers into hockey pucks to achieve safety," she explained. The second reinforcing message, she said, was that thermometers are easy to use and accurate.

This research, as well as additional research, formed the foundation of the educational materials for the campaign, including the Thermy™ messenger. The campaign was kicked off in May 2000 with a media event featuring a chef demonstrating the use of food thermometers in everyday foods. Public service announcements featuring an animated video were distributed via satellite and mailed to 600 TV stations. Ten thousand promotional kits were distributed to educators nationwide.

Since 2000, the Thermy™ messenger and message have appeared in venues across the country, supported by a wide array of partners and partnerships. The Thermy™ messenger has marched in the Macy's Parade greeting 2 million spectators and 60 million TV viewers, popped into view on the *Today Show*, and turned up at fairs and schools from New York to New Mexico.

New research shows encouraging results. The 2002 Food Safety Survey reveals that thermometer usage by main meal cooks increased from 3 percent to 6 percent. The goal, said McPeak, is to reach 10 percent by the year 2010.

Thermometer sales have also increased. Since 2000, average sales have increased about 10 percent each year. And thermometers are turning up everywhere with new looks and new applications: on digital-read forks, remote sensors, and as thermometer probes. "They are more accessible and user-friendly," McPeak explained.

National, State, and local initiatives have all contributed to these results. Here's just a sample of the campaign's wide reach:

- Since 2000, FSIS has distributed more than 100,000 Thermy™ kits in English and Spanish nationwide.
- The Thermy™ Web site provides a vast array of resource materials including consumer research, artwork, reproducible materials, campaign materials, and more, McPeak reported. All information is available in both Spanish and English.
- The thermometer industry has embraced the campaign, McPeak said. To date, 10 thermometer manufacturers use Thermy™ and his safe food handling message on their packaging and in product information. In addition, they have been active partners, McPeak said, donating food thermometers to communities and supporting educational campaigns.
- Grocery stores also have joined the campaign. Wegmans was the first grocery store to promote safe cooking temperatures and embraced the Thermy™ campaign since its beginning, McPeak said. Dozens of other grocery chains around the country—including Jewel-Osco, Giant, and Wal-Mart—have promoted the campaign, complete with in-store demonstrations and promotions.
- The costumed Thermy™ messenger and campaign materials have been utilized by cooperative extension and local public

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"The research revealed that behavior change is possible. It suggested that we target parents of young children as an audience most open to our message."

*Holly McPeak*



health staff in fairs throughout the country, making dozens of appearances each year—including Puerto Rico.

- Local educators have supplied their own initiative and creativity. Cooperative extension agents in New York created a puppet show featuring Thermy™.
- In 2002, FSIS expanded the Thermy™ campaign to include FDA *Food Code 2001* temperatures for retail and food service. A new line of educational materials using these temperatures includes posters and refrigerator magnets. Working with the USDA's Food and Nutrition Service, FSIS has provided these materials to nearly 100,000 schools throughout the country.

Looking ahead, McPeak said new steps for the campaign will focus on refining the use of social marketing to target the campaign to the audience most likely to change behavior: a sub-set "trend-setting" segment of parents of young children.

**Thursday, September 19, 2002**

### **Panel Discussion: Communicating Food Safety in a World Confronting Bioterrorism**

#### **When Food's Not Safe to Eat: Public Health Communications Challenges in the Age of Bioterrorism**

*Sandra Mullin, Associate Commissioner, New York City Department of Health and Mental Hygiene*

Ms. Sandra Mullin directs the New York City Department of Health's communication activities as an associate commissioner. Along with responsibility for media relations, Ms. Mullin oversees health media and marketing, cross cultural communications, community relations, and the agency's Web site. Skilled in both crisis and risk communication, she manages the development of numerous multi-media campaigns on infectious and chronic disease control and prevention, environmental health promotion, and mental health concerns. She has made numerous presentations on topics related to risk communication and social marketing. Ms. Mullin is a columnist for the *Journal of Urban Health* and teaches community organizing at City College.

"I think we all tend to learn from events as we look back at them," Sandra Mullin said, recalling her involvement in both the September 11 terrorist attacks and the anthrax events as Associate Commissioner for the New York City Department of Health and Mental Hygiene.

Of the two events, the anthrax cases created the greater challenge to her department, she said. Describing New York City as one of the most prepared cities in the nation, Mullin said the anthrax incidents still caught the city by surprise.

Immediately following the attacks on September 11, 2001, New York City public health officials issued a broadcast alert to hospitals asking them to report anything unusual. But in this instance, they weren't



looking for illnesses in the right places, Mullin reported. Anthrax didn't turn up in emergency rooms. Instead, it turned up in a doctor's office where a patient appeared in early October with an unusual skin condition.

"We are always asking if we are prepared," Mullin said, "but preparation isn't a static point. It's always changing. We need to remember that preparation is a journey, not a destination."

Dealing with the anthrax crisis was a lesson in reverberating impact and risk communication. As Mullin noted, there were 2 anthrax letters, 8 cases, 1 death, 600 reported cases, and "8 million anxious New Yorkers."

"You need to recognize that even though the risks are small, people will worry. And you need to figure out how to meet the mental health needs of a terrified population," she said.

The impact on the public health infrastructure was also tremendous. "While there were few cases," Mullin said, "there was so much to do. It was particularly difficult on our labs because of the number of samples submitted for testing."

While the perpetrator terrorized the public, Mullin said, her focus was on getting the media to talk to the public about what citizens could do to reduce the risk. While people wanted to know what to do about the anthrax threat, knowledge was changing early on, Mullin said.

To deal with the public's need for information and the media crush, Mullin outlined a number of "tools to facilitate the flow of information":

- a public hotline operating 24 hours a day, 7 days a week and Web site updates;
- daily media briefings in conjunction with the mayor and health commissioner;
- regular contact with elected officials, community organizations, and hospitals' public information officers; and
- critical inter-agency communications.

Drawing on her experiences during this crisis, Mullin said there were a number of important lessons:

- During a crisis, don't overload the public with data. "During uncertain times, what you communicate and how you communicate are both critical," Mullin said, referring to the challenges associated with risk communication. "During a crisis, or when an issue is highly controversial, the public doesn't expect a dissertation that compares one risk to another. This makes people feel patronized or cornered. Data do not impress people when they are upset." The public views some risks as more acceptable than others, although those that are imposed on us tend to frighten us even more, she added.

"You need to recognize that even though the risks are small, people will worry. And you need to figure out how to meet the mental health needs of a terrified population."

*Sandra Mullin*



Mullin recommended that spokespeople be able to "model being able to bear fear" and uncertainty. "Let people be afraid," she said. "It's a terrifying situation. Don't tell people they shouldn't be afraid."

- Get messages ready in advance. "We need to fine-tune public health messages now," Mullin said, noting that New York is preparing fact sheets, putting them on the Web, and disseminating them so key agencies and individuals know in advance the instructions that would be given in the event of an emergency.
- Prepare staff. Cross-train staff for crisis activities, check contracting requirements for setting up emergency hotlines, prepare media lists, update phone numbers and e-mail list serves, and keep the batteries fresh in two-way radios.
- Build trust beforehand. Mullin advised agencies to build trust with the public and with crisis partners before an emergency occurs. These partners are varied and can include other government agencies, industry, and the media.
- Empathize with the public. Mullin recommended that spokespeople be able to "model being able to bear fear" and uncertainty. "Let people be afraid," she said. "It's a terrifying situation. Don't tell people they shouldn't be afraid."
- Don't use reassurance to minimize concern. "The principle of straight talking is never more critical than during a crisis," Mullin said. False reassurances have a potent kick-back effect. Once credibility is lost, it may not be regained, she said.
- Don't be afraid to say you don't know, Mullin advised. "We don't do this enough," she said, "and I think it's a critical thing to remember. It's better to irritate people by saying you don't know than to lose credibility later."

Agencies also need to realize that a crisis may be around the corner, Mullin said. "It is important for government agencies to say what they are doing so the public knows they are trying to be as prepared as possible." Now is the time to share preparation plans and information with the public, to improve agency communication skills, and to meet with stakeholders, such as citizen's groups, unions, environmental groups, and elected officials, she said.

Finally, she noted, in the event of a crisis, the public wants to take action. Channel that, Mullin advised. Agencies should help the public be more informed and involved in disaster planning and communications response. "In a crisis situation," she added, "people tend to be brave and more tolerant of uncertainty than we realize."

### **Panel Discussion: Communicating Food Safety in a World Confronting Bioterrorism**

*Kay Golan, Special Assistant to the Deputy Director, formerly Director of Media Relations (1997-2002), Centers for Disease Control and Prevention*

Kay Sessions Golan is the former Director of Media Relations for the Centers for Disease Control and Prevention (CDC). She has over 20 years experience in media relations, public affairs, crisis communication, and



public policy. Ms. Golan directed the strategic planning and response to the print and electronic media, which was mentioned over 30,000 times in 1 year in print. CDC is frequently in the news as the expert scientific agency on public health issues such as emerging infectious diseases like West Nile virus, flu, ebola, and hanta virus—as well as chronic disease prevention and environmental health. Ms. Golan had a pivotal role in oversight of the crisis communication team at CDC during the anthrax/bioterrorism event.

"Our world changed on September 11—and it changed again on October 4 when headlines about anthrax hit every newspaper in the country," said Kay Sessions Golan.

Golan knows. She was director of media relations for CDC in October 2001.

For Golan, the moment of change came when she was moving through an ordinary October evening.

"I was in the car coming from seeing my son's high school play—for the fourth time that weekend," she said. As Golan drove, she listened in to a conference call from CDC investigators reporting on the first reported anthrax case in Florida. The investigators dropped a bombshell—they had found anthrax on the victim's computer keyboard. "I knew then. I knew it wasn't naturally occurring." Golan turned her car from its track home and headed to the press office, which she didn't leave until 2 o'clock the following morning. "One of the most memorable moments was later in the evening on the call to Florida—I could hear police sirens as they came to seal the AMI building," Golan said.

While there was no way to be "prepared" for the coming crisis, CDC's media staff had a clear understanding of their role—and that understanding helped guide them through the many uncertainties that were ahead.

The CDC, best known to many people as the "Disease Detectives," is a national public health agency employing 8,500 people covering 170 disciplines. With today's increased focus on science, the CDC has moved to the forefront of popular interest.

But science, as Golan explained, is frequently a work in progress. "Science is constantly changing, therefore it has many gray areas; it is a complex subject. Our job is to help scientists explain the complexities of their work in understandable terms and to help journalists sort through the complexities of science and report these responsibly."

CDC's increased news visibility was easy to track, Golan reported. In 1990, CDC was in the news 6,330 times. By 2001, the number had rocketed to 17,205. Calls to the press office had increased from 8,000 a year in 1989 to over 20,000 a year. Clearly, usual media scrutiny was intense.

For the next 3 months following October 4, 2001, nothing was as usual. Normal volume of press calls at CDC ran 25 to 75 calls a day.

"Our world changed on September 11—and it changed again on October 4 when headlines about anthrax hit every newspaper in the country."

*Kay Session Golan*



"Science is constantly changing, therefore it has many gray areas; it is a complex subject. Our job is to help scientists explain the complexities of their work in understandable terms and to help journalists sort through the complexities of science and report these responsibly."

Now they were running 350. As Golan explained, "we needed to feed the beast," the virtually insatiable media need for information on a daily basis.

Managing that need is no small task, especially when the question is: "What's happening?" And the answer is: "We're not sure."

How did Golan manage? What was key?

"We knew we needed to stick to basics. From earlier work we had done concerning public expectations of CDC, we knew that people were looking for two things from us: timeliness and accuracy.

"Now, these two concepts can be in conflict—that was our most critical problem—balancing the two." That balancing act was also their core function, Golan realized.

To achieve that balance, they followed a straight-forward formula: "Tell people what you know. Tell them what you don't know. Tell them what you're going to do next," said Golan.

Because timeliness and accuracy are equally important in the formula, Golan would not provide public statements that went beyond the science. But she also needed to let the public know they were looking for the answers and Golan tried to channel the public's desire to take action.

For instance, people wanted to know how they could protect themselves and what they should do with their mail, she said, particularly after the death in Connecticut was attributed to cross-contamination. "We told people: Be careful handling your mail. Don't rip it up into little shreds where it could aerosolize the possible anthrax spores. Wash your hands after handling your mail. Those were things people could do. They certainly weren't going to hurt people, and they might have helped people. But there was no guarantee that they were absolutely going to prevent people from contracting anthrax."

Other keys for people involved in crisis communication:

- CDC had two teams operating, and "that was a lifesaver. We needed to rotate staff and that included me. We worked 4 days on and 3 days off," Golan said. Press officers were also deployed with investigation teams.
- CDC used a multi-channel approach to get news out—but the single most effective tool was the daily telebriefing. "It gave the media information it needed every day—and it allowed us to manage the time of the science experts. They didn't have the time to answer media questions all day—they needed to try to solve the problem. We took their time for an hour and then they got back to the task at hand—looking for answers to questions never before asked," she said. Other channels of communication included video, audio, and press releases; satellite training for public health professionals; Web information; and individual interviews.
- Stay in your niche, stick with your core functions, and don't speculate. "When there are so many players in an emergency



situation, it's important not to speak to issues outside your area," Golan said.

- Set up emergency teams in advance and let them work together.
- Pay attention to little things—such having a database of names and phone numbers on your hand-held computer.
- Get talking points on topics in advance of a crisis. Difficult to do, but important.
- Stay calm and set the tone for your staff.
- Rotate staff, including the leadership role. "This was hard to do, but important," Golan said.
- Don't take criticisms personally, "let it go."
- Be flexible.
- Ask for help.

Meeting the needs of the media and the public in times of crisis *always* comes down to a balancing act between timeliness and accuracy, Golan concluded.

### **Panel Discussion: Communicating Food Safety in a World Confronting Bioterrorism**

#### **Communicating About Food Terrorism**

*Irene. E. van Geest-Jacobs, Food and Nonfood Authority, Ministry of Agriculture, The Netherlands*

Formerly Director of Communications and Information for the Ministry of Health, Ms. van Geest-Jacobs currently is Director of Communications and Information for the newly formed Food and Nonfood Authority of the Netherlands. As a consultant, Ms. van Geest-Jacobs has specialized in the development and implementation of communications strategies, including crisis communications and internal communications during reform processes.

The events of September 11, 2001, "were obviously headline news in the Netherlands. We naturally felt for the United States," said Ms. van Geest-Jacobs, director of communications for the recently formed Food and Nonfood Authority (FNA). "The attacks also made us realize just how vulnerable an open society is. They showed how easy it is to destabilize society. And they highlighted the importance of taking precautions," she said.

Van Geest-Jacobs encouraged the international community to move quickly to improve communications that would be vital in the event of bioterrorism and food terrorism. "So far, however, there is hardly any international coordination, even though we all know that foods are produced and sold worldwide and, in Europe at least, food problems are often cross-border problems. The European Food Safety Agency is in the process of being set up and one of its primary areas of attention will be communication. Perhaps we should not wait that long and should start exchanging knowledge now," she advised.



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"Our concern centered on deliberate infection with smallpox and anthrax. We also considered the possibility of food terrorism. We tried to envisage a situation in which we needed to communicate and what the community would expect us to do in such a situation."

*Irene E. van Geest-Jacobs*

Van Geest-Jacobs' recommendations are the result of her work in the Netherlands identifying the risks of bioterrorism prior to the 2001. "Initially," she said, "our concern centered on deliberate infection with smallpox and anthrax. We also considered the possibility of food terrorism. We tried to envisage a situation in which we needed to communicate and what the community would expect us to do in such a situation."

To help assess what needed to be done, they projected two hypothetical scenarios, one involving rat poison contaminating bottled beer, the second involving a more wide-spread threat of an unidentified contaminant in milk. By running through these exercises, they identified "just how important communication is," van Geest-Jacobs said.

Her advice, she said, can best be summarized as: **P, A, and R:**

- Prevent
- Prioritize
- Prepare
  
- Alert
  
- Respond

"It all starts with the three **P's**," she explained. "**Preventing** food terrorism begins by making it difficult for people to gain access to the places foods are produced. We can make it more difficult to perpetrate attacks and also discover them quickly by having a good system of controls throughout the supply chain. This requires good communication with the food industry and retail organizations. At the Food Inspection Agency in the Netherlands, this is a major point of attention."

It's also important to **Prioritize** the foods most at risk, van Geest-Jacobs explained. "It is unrealistic to think that you can prevent and control everything. To combat food terrorism effectively, you must set priorities. You need to identify the foods most vulnerable to acts of terrorism and focus on those products. So, what foods are we talking about?"

They identified several features that could increase risk:

- large quantities of food,
- liquids, and
- high velocity sales.

They also identified certain products more at risk:

- dairy products,
- edible oils,
- beer, and
- water.

The next step, she said, is to identify how you **Prepare** to deal with these risks. "In this phase, preparations center around gathering



knowledge. Who possess knowledge of these products? From whom can we get information about bacteria and viruses? Who has knowledge of the market, distribution, and use of the product among consumers? What government agencies are involved? You have to get the best possible picture of all of these matters," she explained.

From this knowledge, van Geest-Jacobs continued, you begin to build a system that allows you to move to the next phase: **Alert**. The Netherlands has two alert/notification systems. The Food Inspection Agency has an "incident desk" for the public to report items of concern. Businesses, as well as the public, utilize the incident desk, which in 2001 received 40,000 notifications. Of these, 5,000 were investigated. "Last year we had an advertising campaign to make people more aware of the function of the incident desk. Our messages was simple: If you notice something strange in food, let us know," she said.

The second notification system in place is for physicians, hospitals, and other health professionals. They work through local health authorities to report infectious diseases, including food infections.

In light of new concerns, the Netherlands has introduced a new criteria for those screening reported incidences: malice. "The person who assesses the notification now always examines whether there is any indication of a conscious or deliberate act," she explained.

The final step, van Geest-Jacobs explained focuses on **Respond**. "My golden rule for crises response is: communicate and coordinate. The Netherlands is a very small country, so it is easy for us to coordinate action," she said.

International coordination should begin immediately, she recommended. "Because the fight against food terrorism requires intelligent preparation, early warnings, broad-based coordination, and honest communication. All in the hope that you'll never need to put your preparations into practice!"

## Friday, September 20, 2002

### *Interactive Workshop: Planning the Future of Food Safety Education, facilitated by Tom Kornbluh, Feola & Kornbluh Associates*

The following material includes:

1. Summary of the Workshop's Purpose,
2. Description and Overview of the Process,
3. Results of the Data Collection,
4. Summary of Interactive Collaborative Planning Process, and
5. Summary of Suggested Regional Initiatives.

"Because the fight against food terrorism requires intelligent preparation, early warnings, broad-based coordination, and honest communication. All in the hope that you'll never need to put your preparations into practice!"



"The process was designed to strengthen the conference experience and promote collaborative action at the regional level."

Tom Kornbluh

## 1 • Summary of the Workshops Purpose

More than 600 people attended the national conference on food safety education, representing 48 U.S. states and educators from all over the world. By entering responses to an online Planning Tool at kiosks throughout the conference center, attendees voiced their thoughts regarding their goals, food safety education needs, and provided information on their budgets and organizations.

On the last day of the conference, this data – along with the knowledge and experiences gleaned from the conference itself – were used to create an Interactive Collaborative Planning Process. Everyone's knowledge, experience, and best ideas were brought to the fore as regional teams gathered to put theory into action – to think globally and act locally.

From the information gathered, participants drew knowledge about overall objectives, target audiences, education gaps, and budget parameters. As teams, they then merged the information with knowledge drawn from conference sessions to identify actions they could take.

The following section describes the process, summarizes results from input to the Planning Tool, identifies conference attendees' priorities, and provides a list of some of the initiatives suggested during the regional teams' brainstorming.

## 2 • Description and Overview of the Process

### Purpose

According to facilitator Tom Kornbluh, the Interactive Collaborative Planning Process was created to provide an opportunity for participants of the conference to immediately put into action new ideas and to support the theme of the conference – *Thinking Globally–Working Locally*. "The process was designed to strengthen the conference experience and promote collaborative action at the regional level," Kornbluh explained.

### Creating the Planning Tool

The online web-based Planning Tool was created through the involvement of the Conference Planning Committee and the feedback of many food safety educators and administrators from around the country. The questions were developed to collect data that would be useful in the development of future food safety products and services, as well as helping to improve the performance and quality of current practices. Questions were developed as "forced choice" priorities and "open response" text formats to maximize the usefulness and coherence of the resulting data.

The Planning Tool contained the following questions:

- Please rank your top five food safety education priorities for the next year.



- Rank your top three primary target audiences.
- Which five tools or resources would best help you accomplish your food safety education goals?
- Rank the top five sources you most often use to obtain food safety education information, tools, and resources.
- Rank the three most significant gaps in food safety education materials or research.
- How can we best continue communication among food safety educators after this conference ends?
- Is your organization a member of a food safety partnership whose structure includes members from industry, academia, government, and consumer organizations?
- What is the name and contact information for one partnership?
- At what level is the partnership?
- How much of your professional time is spent developing and conducting food safety education programs?
- What is your organization's average annual budget for food safety education programs? (Please include external funding.)
- What is your professional affiliation?
- Please indicate the state or country where you work.

### Collecting the Data

The Planning Tool was available online during the conference and was heavily publicized to encourage participation. Through the use of incentives and regular reminders, 82 percent of the attending participants completed the tool before the end of the third day. Attendees could complete the tool through the use of kiosks available at the conference facility or through their own computers and Internet connections.

### Presenting the Data

Once the data were collected at the conference, the Conference Planning Committee analyzed the information to establish important highlights and extract whatever key priorities were suggested by the responses. The summary of the data was presented to the entire plenary session in the Collaborative Planning segment on the final day of the conference.

### Regional Discussions

For the final regional planning session, attendees were seated at tables by region so that new relationships could be established and potential actions and initiatives could be discussed in a regional context.

Once the data had been presented, attendees were led through a series of discussions by volunteer facilitators who had been briefed and trained by the Conference Planning Committee. The facilitators were responsible for capturing key themes and contacts that emerged from the discussions. The facilitators asked the following questions to initiate and focus the conversations:

- “As you reflect on the conference, where do you think we, as a food safety community, need to focus? What should be our to-do list?”
- “What is a high-impact initiative on which you can collaborate regionally?”

At the conclusion of these regional conversations and planning session, selected groups reported their results and proposed action plans to the entire conference as examples of the work that had been done. The results of regional conversations were captured and are summarized in this document.

### 3 • Results of the Data Collection

The Planning Tool collected 511 responses during the course of the conference (82 percent of conference participants). The Planning Tool yielded the following results:

#### Significant Demographics

##### Professional Affiliations

- 23.7 percent work with a Federal Agency
- 23.3 percent work with a University Extension Service
- 12.4 percent work with local or State health departments (6.4 percent local, 6 percent State)
- 8.5 percent work with a College or University
- 7.8 percent work with the Food Industry

##### Time Allocated

Respondents were asked to designate an approximate percentage of their work hours dedicated to food safety education.

- Over 30 percent spend less than 25 percent of their time on food safety education.
- Approximately 25 percent spend from 25-50 percent of their time on food safety education.
- Approximately 15 percent spend 50-75 percent of their time on food safety education.
- Approximately 15 percent spend 75-100 percent of their time on food safety education.

##### Size of Annual Food Safety Budgets

Respondents were asked to estimate the total annual budget of their organization allocated to food safety education.

- Approximately 40 percent have annual food safety education budgets of over \$25,000.
- Over 20 percent have an annual food safety budget of less than \$5,000.
- Slightly over 10 percent have annual food safety budgets of over \$1 million (\$1,000,000).



Of those with budgets over \$1 million, 65 percent are Federal agencies, 12 percent are university extension, 12 percent are other State and local agencies, about 4 percent are food service industry related, and about 2 percent are health care establishments.

### **Geographical Representation**

Respondents represented 48 U.S. states and educators from all over the world. Foreign representation included: Australia, Argentina, Bermuda, Brazil, Cameroon, Canada, China, Columbia, Ecuador, Guam, Hong Kong, Indonesia, Ireland, Japan, Mexico, the Netherlands, New Zealand, Nigeria, Puerto Rico, and the United Kingdom (and Wales).

### **Food Safety Partnerships**

Sixty-five percent of conference attendees are members of food safety partnerships. These partnerships are formed under Federal, national, or State auspices and include members from industry, academia, government, and consumer organizations. A significant number of these partnerships – 38 percent – are organized at the State level.

### **Sources of Food Safety Information and Resources**

The respondents look primarily to the Federal agencies (USDA/FSIS, FDA, and CDC) as sources to obtain food safety education information, tools, and resources. Many respondents cited the Cooperative Extension Service as their primary source.

The Internet has become a major vehicle for food safety information according to the respondents. Many Web sites and other sources of information were identified by respondents, particularly for specific material and information requirements. There is extensive use of the [www.foodsafety.gov](http://www.foodsafety.gov) Web site.

### **Food Safety Education Priorities**

One of the most important questions posed by the planning tool asked about the respondents' greatest food safety education priorities for the coming year. Among all respondents:

- The highest priority among respondents overall was that of training food service workers and managers. Over 42 percent of all respondents selected this as their first or second highest priority.
- The next highest priority was that of promoting hand washing.
- Educating children ranked third.
- The fourth highest priority for the respondents as a group was promoting the principles of Fight BAC!®.
- Many respondents also indicated that educating the public about specific pathogens and evaluating existing food safety education programs were high priorities.

- For the subset of respondents who work for the food industry, their highest priority by far was the food safety education of culturally diverse audiences. Approximately 64 percent of industry representatives selected this as their highest priority. Other goals mirrored those of the group as a whole.
- For those representing Federal agencies, the most significant priority was addressing food biosecurity. Almost 40 percent of Federal agency respondents selected this priority as their first or second highest priority.
- Several priorities emerged as particularly high priorities in individual regions. For example, respondents from the Northwest region selected the priority of educating higher risk populations as one the most important in the coming year. Respondents from the Western region indicated that increasing food science literacy was a very high priority – higher than that suggested by those from other regions and the respondents as a whole.

### **Target Audiences for Food Safety Education**

Once again the data showed food service workers as the highest priority target audience for the coming year. Over 52 percent of respondents indicated that food service workers were their first or second highest priority target audience.

Other target audiences identified included the general public, educating children, educating the school community, educating parents of young children, and educating seniors – in that order.

Those in the Northwest region also identified public health officials as a principal target audience. While those in the North Central Region added the target group of caregivers to their highest priority list.

### **Tools and Resources**

Respondents were asked to identify those tools and resources that would be most helpful to them in their work.

The most important tool according to respondents is print publications for consumers. This is followed by a desire for materials and programs on video and materials on CD-ROM. Many respondents are looking for Web-based materials that can be downloaded through the Internet. And, of course, many respondents are looking for food safety education materials designed for food service workers.

### **Material and Research Gaps**

Respondents were asked to identify the gaps in food safety education materials, material availability, and food safety research.

- Respondents overall indicated that that biggest gap was in food safety education materials in languages other than



English. About 35 percent of all respondents identified this as their first or second highest priority. Some of the language gaps identified: Spanish, Chinese, Korean, Japanese, Haitian Creole, Vietnamese, and Navaho.

- Approximately 37 percent of respondents identified low literacy materials as their first or second highest priority gap.
- Other gaps included the lack of evaluation tools for food safety education programs and the lack of sufficient consumer behavior research findings. Respondents also suggested more timely release of foodborne illness data.

### Continued Communication

When respondents were asked how they would suggest the food safety community stay connected and in communication after the conference was over, a variety of responses were received.

Most respondents suggested the use of focused listservs and E-mail newsletters. Other suggestions included regularly scheduled "meet me" conference calls, regular State and national conferences, the use of Web-site forums, as well as creating special sessions for food safety educators at professional meetings.

## 4 • Summary of Interactive Collaborative Planning Process

On the last day of the conference, more than 500 attendees participated in the final session and planning process. Conference participants were grouped with other attendees from the same geographical region to create teams and were joined by a volunteer facilitator.

### "Thinking Globally"

The regional discussion began with the question of what the food safety community, thinking globally as a whole, should be working on in 2003. These conversations were wide ranging and covered many more topics than can be summarized adequately here. The conclusion of many of these conversations, however, led to the following themes, which emerged across regions.

- Develop more effective mass media communication strategies to promote food safety.
- Increase focus on educating children through the school curriculum, their parents, and teachers.
- Create more aggressive standards for food safety certification and procedures.
- Increase focus on training food service workers and supermarket handlers.
- Build greater emphasis on educating culturally diverse and low literacy groups.
- Develop more effective and user-friendly evaluation of food safety education – find out what really works to change behavior.



- Support much greater national and, particularly, international collaboration and coordination.

Several themes emerged strongly in the regional conversations that did not show as prominently in the Planning Tool data. The consensus from the regional teams revealed an emphasis on developing more effective mass media communication strategies – a concept not highlighted in the Planning Tool data. Another example was the group's strong emphasis on developing much greater collaboration and coordination across regions.

### **"Working Locally"**

For the second half of the Interactive Planning Process, facilitators led the regional teams to discuss how they might "work locally" with specific initiatives that would most benefit from regional collaboration. These conversations among the regional teams produced outcomes that ranged from simply exploring ideas to developing action plans and time lines for implementation of proposed initiatives.

Most suggested regional collaboration initiatives fell into one or more of the following categories:

- Creating more effective and formal regional partnerships to share resources and information.
- Collaboration on mass media promotional ideas.
- Opportunities for industry, supermarket, and government collaboration on specific educational initiatives.
- Customizing promotional and educational approaches to regional audiences.

## **5 • Summary of Suggested Regional Initiatives**

The following represents a summary of the action outcomes suggested by the regional teams. These initiatives were developed in response to the question: "What is a high-impact initiative on which you can collaborate regionally?" The suggested initiatives are organized by region.

### **Southeast Region**

Suggested Initiatives:

- Develop a collaborative, regional hand washing campaign using materials that are culturally and age appropriate with strong attention to innovative design.
- Institute a campaign to increase food safety awareness/messages on television cooking shows and media outlets.
- Begin work with restaurants/fast food/supermarkets to coordinate with vendors and increase food safety messages on take-out packaging using existing and new educational materials.
- Create enhanced coordination and interaction between Florida



and Alabama extension specialists on specific project initiatives. Communication network will be established with each member by E-mail.

- Create high-impact food safety education programs in elementary schools with strong focus on kindergarten.
- Work with local supermarkets and grocery stores to provide a disposable thermometer with packaged meat and poultry products. Include enhanced video training for store employees.
- Develop more complete database of existing food safety education materials available through Web and catalogs.

## Mid-Atlantic Region

### Suggested Initiatives:

- Strengthen local coordination through regular regional meetings and enhanced electronic communication, including listservs/Internet/Alert System.
- Work with local media (radio) and local health departments to do a "food safety minute" in partnership with local sponsor (e.g., Giant Food, McDonald's, local restaurants, etc.).
- Develop a video for PTA (Parent and Teacher Association) regional meetings. Schedule presentations for the first meeting of the year. Build local capacity by enhanced "train the trainer" programs for school presenters.
- Identify the main health communication need of the regional area and focus intense efforts on that issue. Examples include seafood and wild game in the local region. Create symbols (such as irradiation symbol) that will help in the communication effort. Identify specific audiences and communication channels. Tie in efforts to State and national professional associates to open the dialogue. Have annual regional food safety meetings to exchange information and other resources. Gaps will be identified so that education efforts do not miss anyone. Identify critical audiences that need to be targeted (legislators, health inspectors, immigrants who are not residents, and other closed communities).
- Develop communication effort focused on local food safety managers. Emphasize customer impact of proper handling and specific local requirements. Include public service announcements (PSA's) to drive the message home.
- Build school-based education initiative. Include a Sesame Street-style sing-a-long and youngsters becoming "ambassadors" for proper hand washing. Use PSA's. Begin with pilot study with a few schools – target parents – "Did your child tell you...?"
- Initiate a regional conference to focus on culturally diverse audiences. The conference will lead to a campaign to reach managers and establishment owners with specific guidelines and recommendations.



## Northeast Region

### Suggested Initiatives:

- Use existing major meetings to encourage regional planning and coordination. Initiate a strategy to create an inspector certification program.
- Work through regional grocery chain to provide shopper education. Involve Federal government partnering with the Ad Council to get Fight BAC!® oven mitts, aprons, etc., in popular stores, e.g., Wal-Mart. Collaboration through the Food Safety Training and Education Alliance Web site: [www.fstea.org](http://www.fstea.org).

## Midwest Region

### Suggested Initiatives:

- Develop a strategy to provide greater credibility, accuracy, and accessibility to food safety education materials. Selected committee members will serve as reviewers of new materials.
- Develop programs and support systems to increase monitoring of sanitarians.
- Develop and promote a national single source for immediate food safety information.
- Develop State-level coordination to address and manage potential turf issues, minimize duplication of efforts, and keep people informed of available resources.
- Establish a regional food safety conference.

## Rocky Mountain Region

### Suggested Initiative:

- Build strengthened coordination through the Rocky Mountain Food Safety annual conference. Increase information sharing through enhanced E-mail communication.

## Western Region

### Suggested Initiatives:

- Create work group for sharing resources and information flow across FDA, USDA, Extension Service, and industry.
- Focus on creating innovative programming for seniors in Los Angeles County, including coordination of Fight BAC!® activities.
- Create a food safety "media advisory committee" to better understand and utilize the media in coordinated regional strategy.
- Expand Fight BAC!® messages to include Choose Food for Safety. Annually award a nationally known chef with a multi-organization funded award (e.g., FDA, USDA, American Di-



etic Association, National Restaurant Association, etc.). Give award at a chef's event, followed by continuing publicity and press releases. At the local level, contact specific cooking shows and other local initiatives (e.g., county fair, Made in Hawaii Festival, etc.) to incorporate food safety practices.

### Southwest Region

#### Suggested Initiatives:

- Work with local legislature and city council to support food safety in schools and local restaurants. Include Fight BAC!® bandages and basket of hand washing supplies for school administration.
- Develop regional (Texas) collaboration venues and conferences on regular basis.
- Develop a coordinated "source" for all food safety training resources statewide.
- Work with Department of Health to establish "training schedule" listing all certification programs on a local and State basis.
- Develop coordinated strategy to teach food safety in childcare centers.

### International

#### Suggested Initiative:

- Develop a listserv for enhanced international coordination and resource sharing. Integrate with current Web-based organizations. Report on international education initiatives and share Web-based materials.



# Abstracts of Poster Presentations:

*The following abstracts represent just a sample of the more than 80 poster presentations at the national conference, Thinking Globally—Working Locally: A Conference on Food Safety Education.*

While they don't represent *all* of the poster presentations, these abstracts do capture the enormous diversity of people working in food safety education—and the ingenuity, innovation, and commitment that they demonstrate as they work to improve the health of their community, their country, and the world.

## 1. Development of HACCP Principle Training Materials for Front-line Food Service Workers



Southern Illinois University at Carbondale/Illinois  
Department of Public Health  
*Hea-Ran L. Ashraf, E. Endres, T. Welch, T.C. Girard; J. Bloom D. Blaise, S. Atwood*

Academicians and public health officials have collaborated in developing HACCP-based food handling training materials suitable for front-line food service workers. This training method emphasizes identification of hazards in the foods that one handles and taking appropriate precaution or handling procedures to eliminate or reduce the hazards. This type of basic training is recommended for HACCP implementation at food service establishments. A training kit was produced that included an award winning video, a workbook with recipe exercises, a thermometer, several color posters, and other job aids.

The efficacy of these materials was evaluated by pre and post on-the-job HACCP behavioral observation on a sample of food service workers who attended a training workshop. The results showed a significant reduction ( $p < .001$ ) in food code violations 8 weeks after the training session.

Frequent employee turnover and shortage of time seem to be the primary obstacles in effective sanitation training. In this study, out of 60 workers invited to attend a training session, only 3 volunteered to participate, 34 attended after personal encourage-

ment by local health department inspectors. Out of the 37 who attended, 28 were holding the same job 8 weeks after the workshop.

This study has produced effective HACCP training materials suitable for front-line food service workers. Collaboration between university faculty members and public health officials created a team with various expertise to develop training materials that are practical, up-to-date, and instructionally appropriate.

## 2. Food Safety and Food Irradiation Education: A Multi-State Project



University of California / Food Science & Technology *Christine M. Bruhn, Julie Albrecht, Lynne Brown, Jim Chalfant, Philip Crandall, Sean Fox, April Mason, Karen Penner, Britta Thompson, William Schafer, Ronald Schmidt, Peggy C. Van Laanen*

The goal of this multi-state project is to enhance consumer food safety through increasing their knowledge of factors that lead to foodborne illness and increasing their knowledge of science-based information on food irradiation. This is a multistage, on-going project. The poster reviews the project plan, covers successes and challenges, and describes future activities.

The first stage of the project is to increase the knowledge of those experts consumers and the media consult regarding food safety. Health professionals—such as dietitians, public health officials, and cooperative extension educators—received updated information regarding the extent of foodborne illness, common consumer handling errors, the safety of irradiated foods, and the role of food irradiation to reduce foodborne disease. Almost all States have completed efforts in this area.

Existing written educational material has been selected for health professionals and new material developed for consumers. Additionally, a consumer-oriented videotape describing the irradiation process and the role of irradiation in enhancing food safety has been prepared by Purdue University.

The next stage is to present information directly to consumers, especially in areas where irradiated food is available in the marketplace. While many states have presented information to consumers, irradiated foods are only available in a limited number of states.



Researchers are working within their state to reach supermarkets and meat and poultry producers to increase availability of irradiated foods. When foods are available, consumer information on safe food handling and food irradiation will be presented to consumers through community group meetings. Finally, economists will conduct an economic analysis of the response to irradiated foods in two states where foods are in the supermarket.

This project focuses on consumer education; however, information gained may help increase use of irradiation in the food service industry. This project is supported by a grant from USDA.

### 3. The Pan American Health Organization Food Safety

Education Project Pan American Institute for Food Safety – Pan American Health Organization/World Health Organization  
*Maria José Ravalli*



The Pan American Institute for Food Safety (INPPAZ) is a specialized center of the Pan American Health Organization – World Health Organization (PAHO-WHO). INPPAZ provides technical cooperation to increase the institutional and technical capacity of food safety system in the Americas.

To accomplish this aim, the Institute developed three integrated projects: Modernization of Food Safety Systems, Social Communication and Education, and Promotion of Food Safety Policy.

The Social Communication and Education Project purpose is to promote consumers' safe food handling practices. To achieve this aim, we developed different products and educational materials:

*Main target:* Children in elementary school

*Product developed:* Educational kits with games, posters, stickers, and other materials.

*Secondary Target:* Kids in junior and high school

*Secondary Target:* Mothers

*Product developed:* Public service announcements (TV and radio) and educational kits with calendars and brochures.

"Thinking globally, working locally" describes perfectly our job. Since we have a hemispheric mandate, we use different resources for information, validation, and distribution of our material. The first resource is PAHO representatives and consultants (32

offices in the Americas). By means of electronic conferences, we discuss our messages in order to adapt them to the local conditions and solve the multi-lingual audiences problem. The second resource is governments (municipalities, states or provinces, and federal) and governmental food safety and public health agencies. The third resource is alliances with the media to promote food safety consumer-orientated messages.

Last, but not least, the Education Project uses information from the Regional Epidemiological Surveillance System of Foodborne Diseases (SIRVETA) that compiles data from 24 countries of the Americas to define the population at risk. This system showed, for example, that 40 percent of the reported outbreaks in the Americas occurred in homes.

### 4. The West Virginia School Food Safety Pilot Program

WV School Food Safety Program  
*Scottie M. Ford*



In an effort to address the issue of emerging infections and the continuing rise in the number of annual cases of foodborne illnesses, the Division of Adolescent and School Health of the United States Department of Health and Human Services, Centers for Disease Control and Prevention, awarded a grant to the West Virginia Department of Education. This grant initiated the development and implementation in 2001 of a State-level model for a coordinated school food safety program.

This on-going program is being designed as a uniquely comprehensive, integrated school food safety program that addresses: (1) instruction; (2) staff development for school personnel; (3) State and local policies; (4) school environment and facilities; (5) parent and community involvement; and (6) surveillance and evaluation.

An assessment instrument is being designed on both the State and Federal levels to measure the schools' capacity to address food safety issues and respond to foodborne illnesses. Using input from States that are participating in this grant project, a Federal action guide is being developed to aid in the implementation of a coordinated food safety program in the nation's schools.

Within West Virginia, a main goal of the program is to increase the State's capacity to ensure that all



schools meet high standards of food safety as set forth in the *WV 1999 Food Code*. The program also is designed to help prepare children and families to take an active role in the prevention of foodborne illnesses.

## 5. Communicating Food Safety Across Cultures

Michigan State University  
Cathy Pisano



This study addresses the need to consider culture-specific concepts of trust to communicate food safety messages. Failure to know, understand, and implement safe food practices causes illness. Communicating food safety messages, which are science based, sets in motion campaigns designed to heighten public awareness and motivate people to take action. Preparing effective messages for different segments of the population, however, requires determining what recipients think, what is relevant, and what their lifestyle and living conditions are like.

Two variables that impact risk communication, trust and sociocultural orientation, are the focus of this paper. The process of risk communication with minority communities has perhaps the greatest benefit. Yet this area is the least understood due to limited research defining what is important within cultural groups. The study reported in this paper was designed to improve our understanding of who Arab-Americans trust and perceive as credible messengers of food safety information. The data collected and its impact on education can advance the delivery of food safety material to the Arab-American community.

## 6. Identification of Consumer Food Handling Behaviors Associated With Prevention of Specific Foodborne Illness

Washington State University –  
Food Science and Human Nutrition  
Department  
Val Hillers



To be most effective in reducing the incidence of foodborne illness, educational messages must address factors most likely to result in illness.

Nationally recognized experts in food microbiology, epidemiology, and food safety education were

surveyed using the Delphi technique to develop consensus on food handling behaviors associated with major foodborne pathogens. The food safety experts participated in 4 rounds of Delphi via Internet and edited and rank-ordered lists of food-handling behaviors associated with 13 pathogens. They also rank-ordered the food handling behaviors within five major pathogen control factors: a) practice personal hygiene, b) cook foods adequately, c) avoid cross-contamination, d) keep foods at safe temperatures, and e) avoid foods from unsafe sources.

### Results:

- The experts ranked behaviors related to 'personal hygiene' as most important to prevent infections from *Shigella* species and *Staphylococcus aureus* and second most important for Norwalk virus.
- For *Campylobacter*, *Salmonella*, and *Yersinia enterocolitica*, "cook foods adequately" was top-ranked, followed by "avoid cross-contamination."
- Top-ranked behaviors related to *Toxoplasma gondii* were related to "hygiene" and "adequate cooking." For *Escherichia coli* O157:H7, "adequate cooking" and "avoiding unsafe foods" received the highest ratings.
- The food safety experts ranked behaviors related to "safe temperatures" most important to prevent illness from *Bacillus cereus*, *Clostridium perfringens*, and of secondary importance for *Staphylococcus*.
- Avoiding specific risky foods were the top-ranked behaviors associated with *Listeria monocytogenes*, Norwalk virus, *Salmonella* Enteritidis, and *Vibrio* species.

The expert's rank ordering of food-handling behaviors associated with major foodborne pathogens provides a framework for food safety educators to use in educational programs.

## 7. Food Handling Behaviors of Special Importance for the Very Young, Elderly, Pregnant, and Immunocompromised

Colorado State University Department  
of Food Science and Human Nutrition  
Patricia Kendall, Lydia Medeiros,  
Val Hillers



Consumers vary greatly in their susceptibility to disease from various pathogens based on age, reproductive status, disease state, and immune



function. Thus, there is a need to examine food safety messages to assure they are aimed appropriately based on the needs of the target audience.

Nationally-recognized experts in food microbiology, epidemiology, food safety education, and food safety policy were surveyed using a four-round Web-based Delphi process to develop consensus concerning consumer behaviors most associated with reducing the risk of foodborne illness among young children, elderly persons, pregnant women, and persons with compromised immune systems due to disease or pharmacological therapy.

Behaviors were rank-ordered within 13 pathogens and 5 pathogen control factors for general consumers and then rated for their importance to each of 4 high-risk groups.

For each pathogen control factor, the top-ranked behavior for general consumers was also considered of special importance for high-risk audiences.

#### Results:

- For the very young, elderly, and immune compromised, over 50 percent of all highly rated behaviors were from the "avoid foods from unsafe sources" pathogen control factor; 42 percent of all highly rated behaviors for pregnant women were from this factor.
- "Cook foods adequately" contained the second-highest number of highly rated behaviors, followed closely by "avoid cross-contamination" and "practice personal hygiene."
- The factor with the fewest highly rated behaviors was "keep foods at safe temperatures."

The importance experts placed on behaviors varied somewhat between the four high-risk audiences. The results should help food safety educators focus their efforts on those behaviors of greatest importance to targeted audiences.

### 8.A Case Study in Risk Communication—the Walkerton Story

University of Guelph, Ontario,  
Food Safety Network  
*Bonnie Lacroix*

A "Boil Water Advisory" was in effect from May 21 to December 5, 2000 in Walkerton, Ontario, Canada



because of a contaminated municipal water supply.

A series of unfortunate circumstances occurred in May 2000, causing the largest multi-bacterial water-borne outbreak (including *Escherichia coli* O157:H7 and *Campylobacter*). It was the first documented outbreak in a municipal water supply in Canada. As it turned out, consuming the water in Walkerton in any form was a clear and present danger to local residents and visitors during this time.

Top-line results of several sets of focus group interviews are presented illustrating the impact on daily life of a boil water advisory. The participants included some high-risk groups within the community who shared how they dealt with home water and food handling practices during the emergency.

A brief chronology of events from May 18-24, 2000, the pathogens involved and an overview of issues to consider during a foodborne or waterborne outbreak are provided. Also included is a checklist for communication messages prepared during a crisis. This presentation will be of particular interest to those in the community delivering foodborne or waterborne risk reduction messages to consumers.

### 9. A Food Safety Educational Program for Small Farmers

Federal University of Parana, Brazil  
*A. M. Oliveira, M. L. Masson*



This study was done with small farmers of a southern Brazilian town who manufacture traditional food such as jams, pickles, salami, cookies, pasta, candy, milk, and canned fruits. These farmers work the products from planting to selling. They have traditional familiar habits of production: poor financial resources, lack of information, and a large variation of raw material in their small scale production.

The main objective of this study was to learn the prevention practices of contamination employed by the farmers on production and to give them conditions to learn about Good Manufacture Practices (GMP), according to Basic Texts on Food Hygiene from the Codex Alimentarius Commission.

Therefore, using semi-structured interviews, a general diagnosis was made of their knowledge about current Brazilian food laws, food safety, and the farmers' characteristics. After the interviews, a 10-month course about GMP was planned.



During the course, each topic of GMP was specifically discussed, with oral interviews and objective questions. The classes were planned using brainstorming, group discussion, lectures with dialogue, games, and panel expositions. Students were evaluated during the class and through homework. After the course, the situation was evaluated on the production area.

The farmers' participation was very satisfying, making it possible to design a plan according to what they already do and to define, with their help, what can be changed and what must be changed to adopt GMP. The effectiveness of the program rests on the farmers' participation and their learning about contamination and its prevention.

### 10. Web-Based Food Safety Education and Resources Success Story—What Makes it Work?

Iowa State University  
*Daniel Henroid, Jr., Jim Huss*



Since 1995, the Iowa State University Food Safety Web site project (<http://www.extension.iastate.edu/foodsafety/>) has provided resources for consumers and the food industry. The site is used frequently with over 904,000 page views recorded in 2001 and an average of 10-1/2 minutes per visit. The frequently used site features are information about common foodborne pathogens, daily food safety news stories, food irradiation information, the "Ten Steps to a Safe Kitchen," and the "Consumer Control Point Kitchen." A set of 4 Web-based food safety lessons called "Safe Food...It's Your Job Too" is also frequently used with 90,000 scores registered on the end of lesson online exams.

Other resources are available for food safety and Hazard Analysis and Critical Control Point (HACCP) education. A companion site at <http://www.iowahaccp.iastate.edu> provides a full set of HACCP procedures with examples for small meat processors.

This site also provides training resources to Iowa's 15 Nutrition and Health Field Specialists to teach the ServSafe® sanitation certification programs. Additional online training resources are under development for food service operators as Iowa restaurateurs indicated they would use them to educate their employees (survey March 2001).

The site has received numerous awards from the National Science Teachers Association's SciLinks program, *Restaurants and Institutions Magazine*, Tufts Nutrition Navigator, BBC OnLine, Lightspan, Big Chalk, U.S. News and World Report Online, Golden Web Award from the International Association of Web Masters, Best of the Food Internet by FoodNavigator.com, Links2Go, Food and Wine Online, and the Gourmet Spotlight Award.

### 11. School Food Safety Developed at the University of Rhode Island

University of Rhode Island/Cooperative Extension Food Safety Education Program  
*Martha Smith Patnoad, Lori Pivarnik, Elizabeth Bugden*



Preventing foodborne illness in schools requires a multifaceted approach. This approach includes the development of a "blueprint" for food safety education that includes every member of the school community. This "blueprint" utilizes the strengths of existing partnerships and is building collaborations with new partners in an effort to affect positive food safety behavior change through delivering consistent food safety messages.

The Rhode Island School Food Safety Pilot Project was funded in August of 2000 by the Centers for Disease Control and Prevention. The project's goal is to reduce the risk of foodborne illness in the school setting through educational interventions. The project builds upon the existing Coordinated School Health Model. The partners in the project are the Rhode Island State Departments of Health and Education, the University of Rhode Island Cooperative Extension Food Safety Education Program, and Kids First, a community based nonprofit educational organization.

Activities of the project to date, implemented by the various partners, include an analysis of current Rhode Island food safety education materials, a survey of teachers and administrators to determine what and how food safety educational materials are being used in schools, and development of a project evaluation.

Currently, six pilot schools are developing needs assessments and establishing long and short-range goals to integrate food safety into all aspects of the schools' activities. Educational interventions will be



developed based on these needs assessments and their effectiveness evaluated. Finally a model that can be utilized by other states will be developed.

## 12. A Meta-analysis of International Consumer Food Safety Studies

University of Wales Institute, Cardiff,  
United Kingdom  
*E.C. Redmond, C. J. Griffith*



Illness resulting from foodborne disease has become one of the most widespread public health problems in the contemporary world. Underreporting, particularly of sporadic cases, suggests that the number of individuals who have suffered from foodborne disease maybe significantly higher than actually reported. Internationally, 12-62 percent of reported foodborne disease outbreaks are believed to be associated with food prepared/consumed in the home.

The importance of the home as a location for acquiring foodborne disease has prompted numerous studies that have evaluated consumer perceptions, knowledge, and behavior pertaining to food safety in the domestic environment.

Electronic searches of Internet and library databases, personal communication with food safety professionals, and attendance at international conferences has facilitated the collection of 88 studies carried out over 27 years. Analysis of when studies were published showed increased interest in consumer food safety has corresponded with increased incidence of foodborne disease.

The majority (52 percent) of the studies were published between 1995-1999, and a further 27 percent of studies were published 2000-2002. Many studies were carried out in the UK (48 percent) and North America (42 percent), as well as New Zealand, Australia, Italy, and Eire. A variety of research methods were used to collect information, including interviews (49 percent), self complete questionnaires (26 percent), direct observations (17 percent), and focus groups (8 percent).

Analysis of survey contents showed 92 percent of the studies investigated self-reported practices, 76 percent assessed knowledge, and 53 percent assessed attitudes/beliefs. Although consumers generally have a high level of concern for food safety issues, key

areas where knowledge is lacking were apparent and substantial proportions of consumers fail to implement important food safety practices. Additionally, knowledge and self reported practice of specific behaviors did not correlate with actual observed practices. Results will be discussed in the context of government targets for reducing foodborne disease and development of future consumer food safety initiatives.

## 13. Assessment of Consumer Food Safety Behaviors

University of Wales Institute, Cardiff,  
United Kingdom  
*E.C. Redmond, C. J. Griffith, J. Slader,  
T. J. Humphey*



The potential spread and persistence of foodborne pathogens in domestic kitchens has been recognized as an important food safety issue. Actions related to cross-contamination as a risk factor have been implicated in 39 percent of general outbreaks in the United Kingdom. The aim of this research was to correlate observed cross-contamination actions with actual pathogenic contamination of *Campylobacter* and *Salmonella* after food preparation.

Consumers from three target audiences were observed via closed circuit TV whilst preparing a poultry-based meal involving high-risk practices in a model domestic kitchen. Cross-contamination actions were recorded and analyzed using a risk-based scoring system. Microbiological samples from potentially contaminated kitchen surfaces, materials, and food products were taken after each meal preparation and analyzed for *Campylobacter* and *Salmonella* contamination.

Observation results indicated that consumers handled food with a considerable number and variety of food handling errors. For example, 43-57 percent of consumers used the same unwashed/inadequately washed utensils for preparation of raw chicken and then salad vegetables.

Microbiological analysis showed that 80 percent of raw chicken portions used for meal preparations were contaminated with *Campylobacter* and 6 percent with *Salmonella*. Seventeen percent of consumers who handled *Campylobacter*-positive chickens contaminated the kitchen and a further 17 percent contaminated the end product. In total, 33



percent of meal preparations involving a *Campylobacter*-positive chicken resulted in cross-contamination.

These and other results will be discussed in terms of comparisons between target audiences. It can be concluded that implementation of food safety malpractices during food preparation does result in pathogenic contamination of end products and the kitchen environment. Provision of observation and microbiological data will enable a more accurate evaluation of cross-contamination practices and enable informed development of risk communication strategies to improve food safety practices in the home.

#### 14. Identification of Factors for Successful HACCP Implementation in School Foodservice

Iowa State University – Food Safety Project  
*Daniel Henroid, Jeannie Sneed*



Food safety is of primary importance in school food service, yet many school districts have not implemented prerequisite food safety programs for preventing foodborne illness. Even fewer school districts have implemented Hazard Analysis and Critical Control Point (HACCP) programs due to constraints of time, money, and labor.

A focus group consisting of a national sample of school food service directors (n=10) who had already implemented HACCP was conducted. These directors were selected based on recommendations of the 50 State directors of child nutrition programs. Questions were asked about best practices for developing HACCP programs and strategies for school food service directors to develop HACCP programs. Participants were asked questions about their HACCP programs, such as the motivation for beginning the program, necessary resources, recommendations for developing and delivering materials, challenges to implementing, advantages of HACCP, and strategies to motivate employees to follow HACCP programs.

Participants reported that liability concerns about foodborne illnesses, strong interest in food safety, and desire to serve children safe food were major reasons to begin a HACCP program. They recommended taking an integrated approach to implementing HACCP procedures into current operating practices and using a slow but steady progression. They stressed that documentation of procedures

must be made part of employees' daily responsibilities and part of the work environment. Educating, motivating, and empowering staff were identified as keys to successful implementation. Directors reported integrating HACCP procedures into their systems helped improve customer satisfaction, contributed to making the operation more efficient, and saved money.

#### 15. A Diamond Engagement: An Innovative Food Safety Tool

Allegheny County Health Department  
*Michael J. Diskin*



What would you think if you heard that the health inspector was giving out diamonds? You'd probably think it was pretty strange, but what if those diamonds represented an exceptional rating in a critical food safety category. What if the diamonds meant that a food operator was using a HACCP-based systems approach to food safety? And what if it made your community a safer place to eat...That would be really cool.

Thousands of times each year food safety specialists from the Allegheny County Health Department get the opportunity to engage food operators. An innovative "assessment" tool that determines the food safety status of an operation has been developed. A diamond rating can be awarded in specific categories such as cooking, cooling, reheating, hot/cold holding, protection from cross-contamination, and sanitization to operators who demonstrate control of food safety hazards.

The objective of the assessment process is three-fold:

1. to increase the number of food operations using a systems approach to food safety,
2. to more accurately depict the food safety status of an operation, and
3. to recognize businesses for exemplary food safety work.

The program is unique in that it breaks through the traditional inspection model, provides incentives for food operators, and shifts the emphasis from identifying violations to educating operators on how to implement a HACCP-based systems approach. A two-page assessment form and an accompanying Guide to Food Safety Assessments are available. An evaluation of the program will measure a change in



the number of facilities implementing food safety systems, feedback from the industry, and trends on contributing factors to foodborne illness.

## 16. Voices and Visions in Food and Food Safety in Michigan



Michigan State University  
*L. D. Bourquin, T. A. Ten Eyck, M.A.  
Uebersax, L. G. Occeña-Po, E. C. Mather*

Effective food safety education must be developed through linkages among consumers, academia, and the public and private sectors. Recent work at Michigan State University has focused on constructing and sustaining these linkages through the cultivation of a self-directed Area of Expertise (AOE) team consisting of campus scientists and extension agents, county extension agents, government policy makers and regulators, and food industry personnel. The main focus of this group has been to protect the health of people in Michigan and abroad through the execution of research, educational programs, and the provision of reliable information to policy makers.

The AOE team has three primary work groups—training, consumer education, and the social dimensions of food safety. The training work group has offered training sessions on such topics as HACCP, good agricultural practices, and food handler certification. The consumer education work group has developed materials to be disseminated to consumers and the popular mass media, and the social dimensions work group has been focusing on consumer and industry perceptions of topics such as biotechnology, irradiation, and general food safety.

A Web site has been constructed to serve as an informational source for all audiences concerned with food, and while heavily focused on Michigan issues, information is available for national and international audiences. The Web site is envisioned as a tool for forging collaborations among various centers of Michigan State University and others in the food industry and consumers engaged in some aspect of the food system. The Web site can be found at <http://fooddomain.msu.edu>. Funding for this project was provided by the W. K. Kellogg Foundation and Michigan State University.

## 17. Internet-based Multimedia Food Worker Training: Development and Evaluation



Oregon Center for Applied Science, Inc.  
*Lynne H. Grilley Swartz*

This project developed and evaluated a unique video-based Internet foodhandler training program. Funded by the Centers for Disease Control and Prevention, the program is theoretically grounded in behavior change principles (Theory of Reasoned Action and Social Learning Theory) and proven instructional design principles.

Unlike the many programs targeted for food managers, this program is designed to include entry level, lower literacy workers and contains unique features to evaluate worker knowledge and attitudes. Video-based motivational testimonials and positive message framing attempt to impact the users' attitudes, intentions, and self-efficacy towards performing safe food handling techniques. No prior computer experience is required to navigate the program. Internet access with intensive server logic allows for central administration and dissemination of testing materials for certification purposes, and simplified customization and updates. The program is ideal for public health departments or large work sites that need to inexpensively and consistently train and/or certify workers.

Based on the 1999 FDA *Food Code*, the program consists of video, animation, and graphics covering principals of food safety, proper hygiene, temperature controls, avoiding cross-contamination, and proper storage. Graphic-based interactive learning activities reinforce the critical skills for each section. The final skill-building section consists of a "real world challenge," where the user identifies food handling errors made in a realistic workplace.

The program was evaluated with over 500 food workers seeking certification in Oregon. Results indicate that the program was quite efficacious with both experienced and inexperienced food workers. Workers showed gains in knowledge and increased positive attitudes, intentions, and self-efficacy in performing food safety tasks.

## 18. Food Safety Assessment Work of the National Association of County and City Health Officials



National Association of County and  
City Health Officials  
*Becki Shapac*

It has been estimated that each year 76 million persons experience foodborne illnesses and that 5,000 food-related deaths occur in the United States. In localities across the country, ensuring safe food stands out as a principle environmental health responsibility of the Local Public Health Agency (LPHA). According the National Association of County and City Health Official's (NACCHO) 1992-1993 *National Profile of Local Health Department* and a subsequent 1997 survey, food safety activities are most commonly cited among the "environmental health services" which the LPHA provides. Most often, the LPHA is responsible for inspections and/or licensing of restaurants and food and milk control.

Recognizing the need for improving local environmental health effectiveness, the Centers for Disease Control and Prevention's (CDC) National Center for Environmental Health (NCEH) partnered with NACCHO to conduct a 5-year project. The first 2 years have focused on assessing current activities, abilities, and needs at the local level around food protection. The assessment consisted of a mailed survey to randomly selected LPHAs and focus group discussions with health officials. The key findings included the needs and weaknesses of LPHA's food safety programs. They consisted of lack of training, funding, staff, staff retention, technology, and equipment. The findings also identified issues with regulatory loopholes and complexities.

The coming 3 years will build on research findings and will focus on addressing gaps and implementing programs to build local capacity for reducing foodborne illness. Primarily, NACCHO will provide resources, technical support, and expertise to enhance LPHA's food safety programs in the identified areas.

## 19. Food Safety Certification Training for Chinese-American Food Service Workers in South-Central Pennsylvania



Penn State Cooperative Extension  
*Nancy Wiker, Margaret Malehorn,  
Karen Karnes,  
Larry Sulpizio*

Penn State Cooperative Extension, Penn State Continuing Education, and the Pennsylvania Department of Agriculture Bureau of Food Safety collaborated to implement food safety certification training for Chinese-American food service workers in south-central Pennsylvania. The purpose of this outreach effort was to assist Chinese food service managers to comply with the Pennsylvania Food Employee Certification Act, which went into effect on July 1, 2003, requiring all licensed food service establishments to employ one certified employee.

This exceptional program employs a Chinese-American instructor, qualified with the National Restaurant Association, to teach the course in Chinese, using a Chinese text and exam. A brochure in Chinese was prepared and direct marketed to Chinese food establishments. Because local sanitarians identified specific cultural practices indigenous to this population and language barriers, a field trip to a Chinese restaurant for hands-on training/demonstration was incorporated. In addition, a Chinese cultural diversity training for staff of all collaborators was held to facilitate cultural understanding.

Four 16-hour classes were conducted using ServSafe® Chinese curriculum materials. Corresponding handouts and posters were translated into Chinese. Ninety-seven percent of the participants (n=89) qualified for certification. Sanitarians inspecting Chinese food establishments indicated participants were more likely to practice safe food handling techniques.

Materials and processes developed for this program provide a training model for additional diversity programming in Chinese and other languages.



## 20. Handle With Care: Keeping Your Child's Formula, Expressed Breast Milk & Food Germ-Free



Rutgers Cooperative Extension of  
Somerset County  
*Daryl L. Minch*

Objectives: Participants will:

1. Gain knowledge about key food safety practices for infants and young children.
2. Describe a behaviorally focused approach to teach parents and child care providers about food safety for infants and young children.
3. Gain practical ideas to implement this program.

Description:

*Handle With Care* is a multi-faceted food safety educational program using behaviorally focused messages in a creative and engaging manner to reach at-risk audiences. Presenter will:

- Summarize research on food safety and feeding practices of parents with children, ages birth to 5 years.
- Present results from a needs assessment conducted with WIC personnel and focus groups of WIC clients.
- Demonstrate the multi-county intervention using the *Handle With Care* curriculum which includes:
  - A food safety curriculum - educator overview, two behaviorally focused lessons, activity sheets, and an evaluation questionnaire;
  - 3 multi-cultural fact sheets on keeping expressed breast milk, formula, and food germ-free; and
  - 2 posters to create awareness of key food safety practices.
- Review results of the program and discuss implementation strategies.

## 21. Working Together to Improve Food Safety in Indonesia



Cormorant Technical Services P/L,  
Australia  
*Carole Theobald*

If you are passionate about food safety and get the chance to help a neighboring country – you jump at it! Well, that is what I did! Jakarta, the capital of Indonesia is closer to Perth, than Sydney. Our neighbor, the fourth largest country in the world, was having a hard time economically and saw that through improving food safety, trade could be improved. Since 2000, I have been involved on a number of projects funded by the Australian Government through its Aus-AID program. The projects have involved training Indonesian officers in advanced chemical and microbiological laboratory techniques for analyzing food, laboratory quality management programs, and also food safety auditing.

Besides trialling basic and more advanced food safety programs in a number of food premises in Java, Bali, and Sumbawa, the team has also developed a CD-ROM package to facilitate the understanding of Australian food labeling legislation by Indonesian exporters to Australia.

Finding a practical approach to introducing a workable system of food safety reform in a land of food safety extremes is challenging. However, our bi-national team has recently developed an integrated national food safety management system and, during 2002, further work is planned that will put the policy document into practice. This will involve developing suitable food safety training materials, establishing a system to integrate and synergise current food monitoring activities, and developing a suitable foodborne disease notification system.

## 22. Communicating New Food Safety Legislation in Australia – Overcoming the Fear Barrier



Cormorant Technical Services P/L, Australia  
*Carole Theobald*

Two national projects sponsored by the Commonwealth Government of Australia have been undertaken to facilitate the introduction of new national

Food Safety Standards in Australia. Previously every state and territory in Australia had its own food safety legislation.

1) *Leveling the Playing Field*. This is a set of training materials for food safety enforcement officers that was developed in consultation with State and Territory Health Departments throughout Australia. It is a 2-day professional development workshop designed to facilitate the consistent interpretation and application of the new Australian Food Safety Standards by Environmental Health Officers. The project involved surveying EHOs throughout Australia to identify their needs, developing draft materials, piloting them in three states, and producing the final resources.

2) *National School Canteen Food Safety Project - Looking After Our Kids*. School canteens in Australia are "school-based takeaways" with one paid staff member and parent volunteers. Menus consist mainly of pizzas, rolls, sandwiches, pies, stuffed potatoes, hot chicken pieces, etc. This 30-minute video and 60-page handbook package has been designed in consultation with School Canteen Associations and Health Departments in all states/territories. It explains the new legislation to school principals, parent bodies, paid school canteen staff, and volunteers – so they understand their responsibilities under the legislation. (The Commonwealth Government will distribute the package, without charge, to all 10,000 schools in Australia.)

### 23. To Reduce Rates of Foodborne Illness, Let's Target Handwashing (and Drying)—A Most Effective Means of Reducing Disease Transmission



Georgia-Pacific Corp  
Barry Michaels

The following is a complete review of the handwashing (and drying) paradigm. It consists of a series of meta-analyses identifying what is known about handwashing effectiveness (in vivo laboratory testing and group handwashing intervention studies), compliance, and education (successes and failures).

A meta-analysis of 16 different in vivo investigations supports claims of high efficacy and allows construction of a hygienic efficiency model for each stage of the handwashing process (washing, rinsing, and

drying). Data from 21 group studies show an average of 40 percent reduction in rates of both diarrheal and respiratory diseases when active handwashing education programs were implemented.

However, handwashing compliance data from 25 studies covering a variety of venues shows that handwashing compliance (HWC) is relatively low and that there is generally an inverse relationship between education and compliance. Over the years, many different approaches have been trailed in order to improve HWC. In an analysis of over 40 different handwashing compliance intervention studies, many produced improvement, but after initial improvement, drop back to baseline. An extensive list of barriers to handwashing were identified and catalogued for targeting with social marketing approaches.

In a study of self-perceived HWC, it was found that there is often a wide variance between self-perception and actual compliance. This and other behavioral aspects of the handwashing paradigm explain why educational programs so often fail to improve handwashing rates. Poor habits are difficult to change and require multimodal intervention programs (as outlined) in order to overcome the psychological impediments to compliance.

### 24. Food Safety Education Needs of WIC Participants



Texas Woman's University/ Dept of  
Nutrition & Food Sciences  
Carolyn Bednar, Junehee Kwon

Participants in The Special Supplemental Food Program for Women, Infants, and Children (WIC) are frequently at high risk for foodborne illness. The purpose of this study was to assess food safety education needs of WIC participants and appropriate dissemination methods. A questionnaire was developed by the researchers, validated by 10 food service professionals, and pilot tested. The final survey, mailed to a stratified random sample of 500 WIC directors nationwide, received 219 responses (43.8 percent return rate).

The highest priority topics for food safety education were handwashing (81 percent), infant formula handling (80 percent), leftover baby food (68 percent), cross-contamination (63 percent), and food preparation practices (57 percent). A majority (91



percent) of WIC agencies indicated that most clients spoke English, but 9 percent had a majority of Spanish-speaking clients. A chi-square test revealed that WIC directors at sites where Spanish is the prevailing language perceived a higher need for educating clients on safe thawing of frozen foods ( $p < 0.05$ ). Infant formula handling was perceived as a greater educational need ( $p < 0.05$ ) at agencies with mainly English-speaking participants.

Director respondents chose the most effective education methods for WIC participants as: game/activity (26 percent), video with discussion (23 percent), video with interactive materials (23 percent), and brochures/handouts (15 percent).

Eighty-seven percent of the WIC agencies currently offered food safety education, usually provided by a WIC nutrition educator or dietitian. Information gained from this study will be used as background to develop bilingual (English and Spanish) educational materials aimed at low-income, low-literacy consumers.

## 25. Disparities in Foodborne Disease Education Among Physician specialties That Treat At-Risk Populations



Georgia Division of Public Health  
*S. Thomas, K. McCombs, S. Lance-Parker*

### Background:

Because of the higher risk of illness in immunocompromised and pregnant individuals and the inherent lack of food safety education, physicians whose specialties are intimately involved in the treatment or management of at-risk individuals are essential in the education of these populations about foodborne disease.

### Methods:

In 2000, the Georgia Emerging Infections Program conducted a survey on foodborne disease risk and prevention targeting four physician specialties that treat immunocompromised or pregnant individuals: obstetricians, oncologists and hematologists, infectious disease (ID) physicians, and nephrologists.

### Results:

Three hundred nine surveys were distributed to these 4 specialties; 87 of the 134 questionnaires returned were used in the analysis. Among the four specialties, no difference was found in the proportion of physicians surveyed that treat at-risk individuals or in the proportion of physicians that reported that their patients requested information regarding foodborne disease. Thirty-eight percent of physicians reported that their practice provides information about foodborne disease to patients. ID physicians' practices were more likely to provide information than both nephrology ( $p=0.001$ ) and obstetric ( $p=0.004$ ) practices, while oncology practices were more likely to provide information than nephrology practices ( $p=0.043$ ).

### Conclusions:

There is a disparity in foodborne disease education of patients among the four different physician specialties. In Georgia, ID physicians and oncologists are more likely to ensure that their patients receive education on foodborne disease risk and prevention.

## 26. Bilingual Food Detectives Fight BAC!®



New Mexico State University Leading  
Object Media Group  
*Jeanne Gleason, Barbara Chamberlin*

New Mexico State University Cooperative Extension Service has produced a variety of multilingual food safety educational materials including those distributed through video, print, and multimedia. Their Food Detectives Web site (<http://www.fooddetectives.com>) reaches kids ages 8-12 with engaging learning games, while videos have been successful in reaching bi-lingual and multi-lingual adult audiences. At-risk populations are also targeted through specific materials including salsa processing, HACCP procedures, child care food safety, and safety for food service providers.

This educational exhibit will highlight the materials available, with versions available for preview and demonstration. Producers will also be available for discussion of instructional design and evaluation procedures of the educational tools.



## 27. USDA Fight BAC!® Campaign Delivered in Inner City of Hartford Targeting Low Income Latinos



University of Connecticut  
*Jigna Morarji Dharod,  
Rafael Perez-Escamilla,  
Angela Bermudez-Millan,  
Sophia Segura-Millan, Grace Damio*

The Fight BAC!® food safety campaign was delivered for 6 months in English and Spanish through culturally appropriate media channels in inner-city Hartford. Pre- and post-campaign household-to-household surveys (N=250 each) were conducted to determine coverage, satisfaction, and changes in food safety knowledge, attitudes, and behavior of low-income Latinos.

Seventy-three percent of respondents were exposed to at least one campaign media (TV, radio, newspaper, and/or posters). Highest campaign exposure ( $p < 0.05$ ) was among those: a) 46 and above, b) unemployed, c) with cable TV at home, and d) attending food pantries. Recognition of the Fight BAC!® logo increased from 10 percent to 42 percent between surveys ( $p < 0.001$ ). The vast majority (92 percent) were satisfied/very satisfied with the campaign. Thirty-nine percent of exposed and 17 percent of the non-exposed group were aware of the term "cross-contamination" ( $p < 0.001$ ). The percentage of those properly defrosting their meats increased from 16 percent to 22 percent between surveys ( $p = 0.09$ ). Results indicate good targeting, a high degree of satisfaction, and positive food safety knowledge and behavioral changes associated with this campaign. Funded by the USDA Food Safety and Quality Initiative.

## 28. International Electronic Newsletter Offering Convenience to Nutrition and Food Safety Educators



National Food Safety Educator's Network (EdNet)  
*Kathy Bernard, Julia Smith,  
Robyn Douglas, Susan Conley,  
Barbara O'Brien, Juanita Yates*

Despite continued progress in improving the quality and safety of foods produced in the United States, food-related illness remains a serious public health

problem. However, most cases of food-related illness can be prevented if consumers recognize the important role they play in ensuring the safety of the foods they eat as well as prepare.

To help address that need, the National Food Safety Educator's Network (EdNet), an electronic newsletter from the Departments of Health and Human Services and Agriculture was launched in order to communicate regularly with food safety educators and cooperators. EdNet provides updates on food safety activities to public health, nutrition, food science educators, and others concerned about food safety. EdNet also delivers the latest information on government food safety initiatives to public and private sector organizations and individuals who disseminate this information to the public. This electronic newsletter utilizes cost effective communication to disseminate information and assures awareness and coordination of each agency's food safety information dissemination activities.

Since its October 1997 premiere, 53 issues of the monthly 3-6 page electronic EdNet newsletter have been disseminated. The number of subscribers is approximately 3500, representing 32 countries. To join the one-way direct mail food safety education network, send the message: SUBSCRIBE EDNET-L firstname lastname to [LISTSERV@FOODSAFETY.GOV](mailto:LISTSERV@FOODSAFETY.GOV). Archives of past EdNet updates are available. See <http://www.foodsafety.gov/~fsg/ednet.html>

## 29. A Spanish Multimedia Food Safety Program for Child Care Providers



New Mexico State University  
*Martha Archuleta, Jeanne Gleason,  
Kari Bachman, Anita Rodriguez*

A Spanish language "Home Child Care Providers' Food Safety Program" curriculum was developed by New Mexico State University Extension in collaboration with the New Mexico Child and Adult Care Food Program. The program was developed using the health belief model, specifically that the threat of foodborne illness in children under the care of participants would be a motivating factor for behavior change.

Prior to development of the curriculum, focus groups were conducted with home child care providers that



spoke primarily Spanish to ensure that information was relevant and culturally appealing. The curriculum focuses on the four areas of the Fight BAC!® campaign. Proper techniques for diapering and safe handling of bottles and baby food are also included.

The curriculum consists of a Spanish *telenovela*- (soap opera) style video, participant booklet, facilitator's guide, behavior change evaluation tool, and certificate of completion.

The social-learning theory was used in designing the implementation of the curriculum. Specifically, the video is used to teach food safety concepts but also to stimulate discussion among participants so they can learn from each other. Activities included in the teachers' guide provide opportunities for participants to practice appropriate behavior and observe others. Further, the evaluation component of the curriculum allows participants to set goals for behavior change. Workshops were conducted with 100 Spanish-speaking home child care providers.

Following participation in training, statistically significant improvement was observed in 8 of the 12 food safety practices measured. This project was funded by the USDA Food Safety and Quality Initiative.

### 30. Egg Safety Education for Children

SGA Associates

Jill A. Snowdon, Christine M. Bruhn,  
Marcia Greenblum



The Egg Nutrition Center, the research and education center on nutrition and food safety for the egg industry, identified the need for food safety education among children. Few materials are available for helping children understand the subject and FoodNet data indicate that about 25 percent of the cases of salmonellosis from *Salmonella* Enteritidis, a bacterium that can be present in the interior of an egg, occur in children.

The California Egg Commission, in collaboration with public health officials in southern California, had previously identified changes in consumer behavior that would block transmission of disease through eggs. The Commission also funded a research project to identify egg safety messages that could be communicated effectively on the label of an egg carton. The research included focus groups to generate label

information and a study among California consumers to test the efficacy of the messages.

The results of the collaboration with the public health officials and the consumer research were combined with consumer education experience from the American Egg Board and formed the basis of the Egg Nutrition Centers project. The Center developed a colorful poster in English and Spanish for children and their parents that used pictures as well as words to help consumers understand basic egg safety concepts. The poster has been well received and over 12,000 copies have been distributed. This work shows the results of combining the opinion and experience of the realms of food technology, public health, epidemiology, consumer research, and the food industry to promote food safety education.

### 31. Science-based Research and Education About Safe Home Food Processing Practices



University of Georgia /National Center  
for Home Food Processing and  
Preservation

E. L. Andress, B. A. Nummer,  
M. A. Harrison, W. L. Kerr, J. A. Harrison

The National Center for Home Food Processing and Preservation is a multi-institutional collaboration funded by CSREES-USDA with The University of Georgia as the primary institution. Scientists from Alabama A&M University and the University of California-Davis are partners. Experts in home food preservation from eight other U.S. universities and industry comprise an advisory committee.

Interest in home food preservation and processing remains high in the U.S., but methods must be continually evaluated against updated information in food safety. It is critical to provide educators and consumers with access to current science-based information concerning safety and quality issues regarding home processing of food, and to encourage adoption of new practices. Therefore, the Center is creating, gathering, evaluating, and disseminating science-based recommendations and conducting research as needed in support of those recommendations.

Multiple strategies for making safe food preservation recommendations available are being used: critical literature reviews and publishing of results; original research; updating of existing USDA and



Extension consumer publications; and establishing additional distribution channels for dissemination of guidelines, including a new Web site: <http://www.uga.edu/nchfp/>

The Center's Web site is the place to find information about the Center's projects and its findings, USDA home food preservation publications, Center publications, links to other Cooperative Extension System publications, multimedia (graphics, animations, slides, and video), and how-to guides.

Other programs in development through the collaboration of the Center include a model volunteer-based Master Food Preserver Program, an instructional video series, and an original Web-based curriculum on home food preservation. Evaluation strategies have been implemented to assess effectiveness.

### 32. The Literary Classics: A New Kind of Reading Material for Public Restrooms

Allegheny County Health Department  
*Michael Diskin, Christy M. Glenda*

The Allegheny County Health Department has released three new posters for public restrooms in a continuing campaign to promote handwashing as a way to combat the spread of infectious diseases.

Displayed inside stall doors and above urinals to provide convenient reading material for a captive audience, the posters contain parodies of classic literature which communicate the importance of handwashing in an interesting and amusing way that people are likely to remember.

The new posters, volume III of a series titled *The Literary Classics – A New Kind of Reading Material for Public Restrooms*, are parodies of *The Adventures of Tom Sawyer* by Mark Twain, *The Hound of the Baskervilles* by Arthur Conan Doyle, and *Emma* by Jane Austen.

The first two volumes were released in 1997 and 1998. They have been shown to significantly increase handwashing rates. A 1997 survey found that 67 percent of women and 50 percent of men washed hands with soap and water in restrooms displaying the posters, compared to 52 percent and 20 percent respectively in restrooms with no posters.



In a survey in 2001, the Health Department found that handwashing rates remain appallingly low in restrooms with no posters. Only 40 percent of men and 56 percent of women were observed washing hands with soap and water, 23 percent of men and 28 percent of women used no soap and only water, while a shocking 36 percent of men and 11 percent of women walked right by the handwash sink and didn't even bother trying.

In a planned follow-up survey, the Health Department will pay particular attention to whether the people using no soap and only water is significantly lower in restrooms displaying the new posters.

Marc Advertising donated its creative services and wrote the text for the new posters. The first set won local, regional and national Addy awards for excellence in public service advertising. The posters also gained national recognition for the Health Department, which received the 1999 J. Howard Beard Award for excellence in public health practice at the local level from the National Association of County and City Health Officials.

### 33. Food Safety for the Occasional Quantity Cook

University of Nebraska Cooperative Extension

*Cheryl Tickner, Sue Brown,  
Carol Schwarz, Cami Wells*

News articles in the mid-1990's reported a number of foodborne illness outbreaks in Nebraska. Most confirmed cases did not occur in commercial food service establishments, but in foods prepared by community groups. A team of extension educators from central Nebraska checked into the problem and discovered community workers have little food safety training and are unaware of health regulations because their facilities are seldom inspected.

In 1997, the team developed "Food Safety for the Occasional Quantity Cook" targeting volunteers and part-time caterers who prepare and/or serve food at banquets, soup suppers, barbecues, food stands, etc. This comprehensive program includes an introductory skit, 56-set screen show, pre/post test, hands-on activities, participant and background materials, evaluation, marketing information, and completion certificate.





More than 250 people, representing several hundred community groups, have completed the training during the last 5 years. Pre/post tests show a 23 percent average increase in participants' knowledge. Follow-up surveys and visits to community events indicate a number of proper food safety practices have been implemented.

### 34. Using Distance Technology for Food Safety Education



The Ohio State University  
*Kristin Best, Lydia C. Medeiros*

Developing a technology enhanced, comprehensive food safety class for undergraduate and graduate students can provide innovative ways for students to learn.

University Technology Services (UTS) of the Ohio State University has a special classroom designed for distance learning that is composed of video cameras, computer equipment, and microphones placed near students. UTS provided a technology expert who was knowledgeable with using the equipment.

Distance learning provided two unique aspects to classroom education. This technology allowed students from a branch campus to attend class in real-time and guest speakers from all over the country to be able to contribute their knowledge without having to travel. Students had the opportunity to speak directly to distant students and guests. They also had the opportunity to use WebCT to access the syllabus and class updates and to participate in a threaded discussion and weekly chat session during the professors' online office hours. Graded assignments were received via the Internet. The class earned 3 hours of graduate credit. Continuing education students were able to register on a pass/fail basis.

Invited speakers were from universities, the Columbus Health Department, industry, and the State and Federal government. Topics focused upon laws and regulations, retailer and consumer food safety responsibilities, cost of foodborne illnesses, food processing technologies, risk communication, environmental impact, and social marketing.

Developing a similar class may help educators provide distance teaching about food safety to students, extension specialists, health professionals, and secondary education teachers who otherwise may not have the opportunity.

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